Products Finishing

CLEANING
PLATING
POLISHING
FINISHING

SEPTEMBER 1951

IS THIS YOUR SONG OF WOE?

THE "CLEANING'S" ENDED...
BUT THE BUFFING COMPOUND LINGERS ON

If your metal finishing problem is efficient removal of caked-on buffing compound from polished parts, an Industrial washer is the perfect solution.

Industrial custom-designs, engineers and constructs machines for this and every other metal finishing need. Whether for washing, rinsing, drying, phosphatizing, treating with Bonderite, (or any desired combination of these operations) Industrial equipment offers efficiency, dependability, labor savings and production economies.

It will pay you to learn all the important advantages of Industrial equipment. Address your inquiry for detailed further information to Dept. 14.

Note: Government specifications (Jan C-490, Grade 1) met.

INDUSTRIAL

WASHING MACHINE CORP.

New Brunswick, New Jersey

Specialists in Cleaning Equipment Design and Manufacture

Which of your metal-cleaning jobs would you like to improve?

Listed below are some of the operations discussed in Oakite's new 44-page illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite materials and methods can give you better production with greater economy.

OAKITE PRODUCTS, INC., 20 Thames St., New York 6, N. Y.

Tell me (without obligation on my part) about Oakite methods and materials for the following jobs:

- ☐ Tank cleaning
- ☐ Machine cleaning
- ☐ Electrocleaning
- ☐ Pickling
- ☐ Pre-paint treatment
- ☐ Paint stripping
- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention

☐ Send me a FREE copy of your booklet "Some good things to know about Metal Cleaning"

NAME.....

COMPANY.....

ADDRESS.....

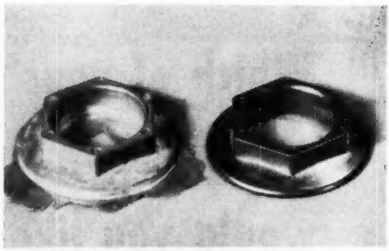
Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE

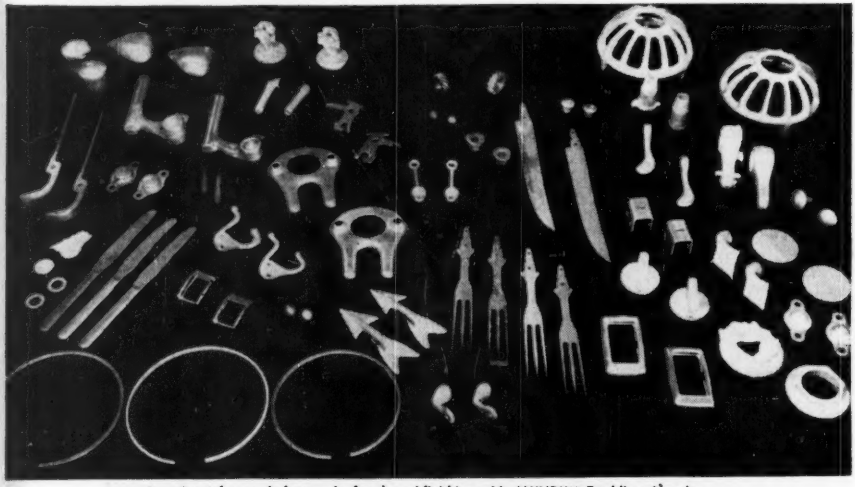
TRADE MARK REG. U. S. PAT. OFF.

SPECIALIZED INDUSTRIAL CLEANING
MATERIALS • METHODS • SERVICE

What Does Barrel-Finishing With ALUNDUM* TUMBLING ABRASIVE Offer You?



with ALUNDUM Tumbling Abrasive.
Typical die casting before and after tumbling



A variety of parts before and after barrel-finishing with ALUNDUM Tumbling Abrasive.
Included are castings, forgings, stampings, and machined parts.

- It provides you with a fast, clean, economical method for finishing your metal parts to exact dimensions and degrees of surface finish.
- It enables you to remove burrs, flash tool marks, and heat scale from large quantities of stampings, die castings, and forgings quickly and inexpensively.
- It eliminates many slow hand-finishing operations, increases production, saves time and money.
- If you don't have barrel-finishing equipment in your plant, Norton will make test runs for you, without obligation, to show you what this process with ALUNDUM Tumbling Abrasive can do for you.

A Tip on Barrel-Finishing

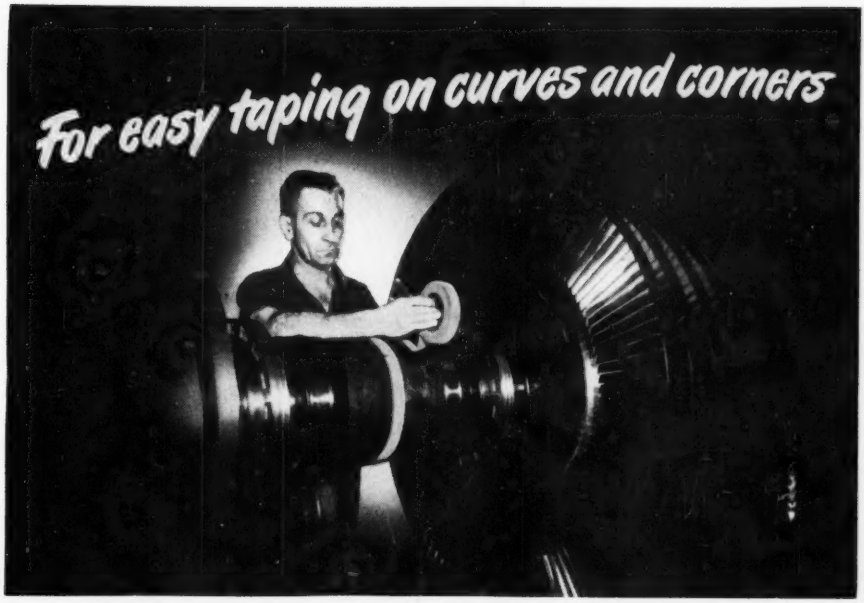
Don't forget that oily parts should be thoroughly cleaned before barrel-finishing. They retard the abrasive action and make it impossible to obtain bright finishes.

Norton Booklet, Form 301, "Precision Tumbling with Alundum Abrasive" is packed with useful information. Write for your free copy.

NORTON COMPANY
Worcester 6, Mass.
Distributors In All Principal Cities

NORTON
ABRASIVES
Making better products to make other products better

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



Tape it with Behr-cat

It's a cinch to do a fast, neat taping job on curves, corners and irregular surfaces with strong, flexible BEHR-CAT Brand Tape. It has the necessary stretch so that it lies flat, without wrinkling when pulled around shaped surfaces. Moreover it has the strength to resist tearing and ripping at the edges on these tough applications. And BEHR-CAT Tape sticks tight under this stress. No creeping back or pulling away from the job. It's a truly balanced tape from every standpoint. Try BEHR-CAT Tape on your next protecting, masking or sealing job and see the difference. Your distributor can supply you, or write direct.

YOUR SPECIAL TAPE PROBLEM is welcomed at BEHR-MANNING. Our laboratories have had wide success in meeting the demand for special tapes and tape application. Put us to the test. Write us today. Address Dept. PF-9.

BEHR-MANNING • DIVISION OF NORTON COMPANY • TROY, N. Y.

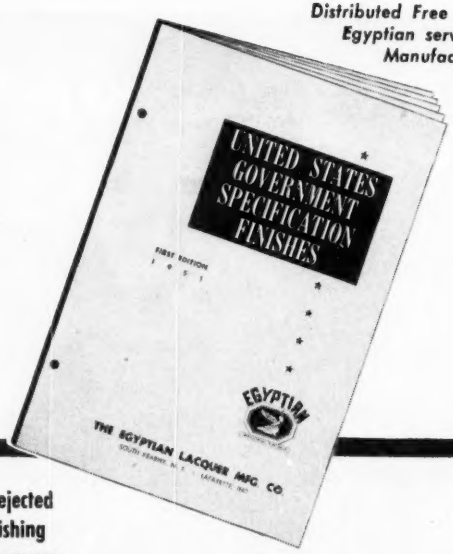
NORTON abrasives

COATED ABRASIVES • SHARPENING STONES • PRESSURE-SENSITIVE TAPES

EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N. Y., U. S. A. • CANADA: BEHR-MANNING CANADA (LTD.) BRANTFORD, ONT.

What Price Wrong Finish?

Distributed Free as an Egyptian service to Manufacturers.



Only the manufacturer of a product rejected by Uncle Sam because Government Finishing Specifications were not followed, can answer this one... He can total his loss in dollars, but who can pin a price tag on distraught nerves and irreparable damage to business reputation. To avoid just such a dilemma Egyptian, constantly on the alert for ways to serve the Product Manufacturer has compiled in simple booklet form practically all Government Finishing Specifications issued to date of this printing. Egyptian will make supplements available as new specifications are released.

MAIL COUPON FOR YOUR FREE COPY TODAY

P. S. Should your finishing problem be urgent, an Egyptian Industrial Finishes Specialist will deliver your copy personally. He'll be happy to give you further information.

Lists

GOVERNMENT SPEC. NO.

•

COMPLETE INGREDIENT DETAIL

•

REQUIRED DRYING PERIODS

EGYPTIAN
INDUSTRIAL FINISHES

THE EGYPTIAN LACQUER MFG. CO.
Box 444, Newark 1, New Jersey

Please forward FREE copy of U. S. Government Specification Finishes.

Mr.....
(Title)

Firm.....

Address.....

.....

Have an Egyptian Industrial Finishes Specialist deliver my copy. ☐ please check

EZRA A. BLOUNT, *Editor*
(On leave of absence
U. S. Air Force)

Products Finishing

SEPTEMBER 1951
VOLUME 15 • NUMBER 12

CONTENTS

FRANK L. BONEM
Associate Editor

H. LEROY BEAVER
ALLEN G. GRAY
BRYANT W. POCOCK
Consulting and Contributing Editors

GENE J. SCHWARBER
Advertising Manager

NORMAN S. ROGERS
Art Director

L. V. SONENSCHEIN
Circulation Manager

ADVERTISING REPRESENTATIVES

RICHARD S. KLINE
GEORGE E. HAY
431 Main St., Cincinnati 2
MAin 0182

G. M. FILLMORE
342 Madison Ave., New York 17
Murray Hill 7-7390

CHARLES H. DEILY, JR.
351 Mattison Ave., Ambler, Pa.
Ambler 0339

JOHN M. KRINGS
Tribune Tower, Chicago 11
DElaware 7-5441

THE ROBERT W. WALKER CO.
2330 West Third Street
Los Angeles 5
DUnkirk 7-4388
57 Post Street, San Francisco 4
SUtter 1-5568

MEMBER

CCA NBP

Published monthly and copyrighted (1951) by

GARDNER PUBLICATIONS, INC.
431 Main Street, Cincinnati 2, Ohio
Printed in U.S.A.

Control Stream Pollution; Save Plating Solutions! 11
Editorial

Pickling for Porcelain Enameling

Part 1—The Spray Pickling Process at Kaiser Metal Products, Incorporated 12
By Frank L. Bonem

Part 2—Pickling with Troxide at the Estate Stove Company 18
By Ezra A. Blount

Conversion Coatings and Specification Finishes . 26
By C. O. Hutchinson

Cobalt Nodule Method Measures Adhesion of Electrodeposits 41

Views and News of the A.E.S. Buffalo Convention 50
Reported by Frank L. Bonem

Spotlighting Finishing Progress
By Dr. Allen G. Gray

—Selection of Organic Coatings for Metal Products 54

—D.C. Power Source for Plating Should be Dependable and Efficient 78

Practical Applications of Modern Products

—Finishing Small Parts in One System 86

—Finishing Time Reduced 50 Per Cent with Hot-Spray Lacquer 88

—Drying of Tractor Parts Improved by Use of Infra-Red Oven 89

—Treatment of Forming, Stamping and Cutting Oils to Ensure Good Cleaning .. 89

News of the Industry 92

New Equipment, Materials, Processes 116

The Finishing Touch 142

Opportunity Section 143

Index to Advertisments 144

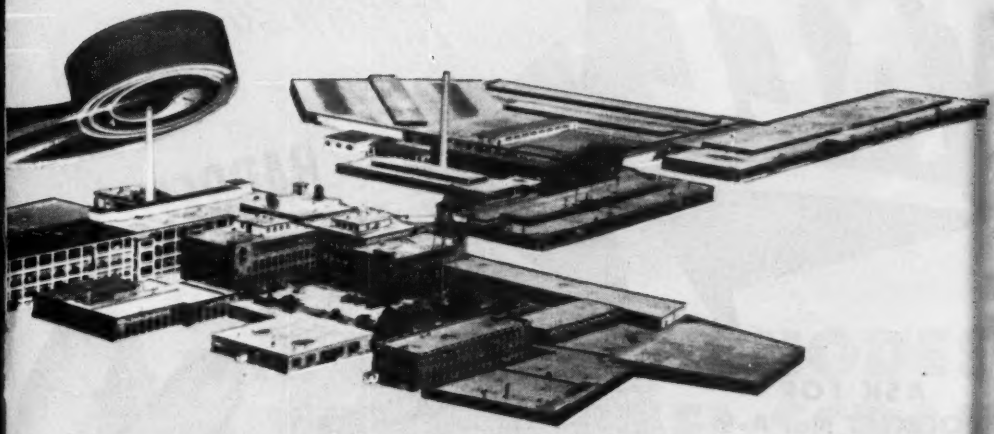
Your Source of 30,000

BEHR-MANNING

COATED ABRASIVES · SHARPENING

NORTON abrasives

COATED ABRASIVE PRODUCTS



BEHR-MANNING PRODUCES EVERYTHING YOU NEED IN COATED ABRASIVES . . .

A statement like that takes in a lot of territory. . . . But we can go even farther and say that BEHR-MANNING produces abrasive products that you *may not now know that you need*, but which if used in your production processes may well bring you important additional profits. For within the 30,000 abrasive products mentioned above, some are very new and their possibilities not yet generally realized.

Within the past seven years, Behr-Manning research and development engineers have brought out and field tested *58 entirely new abrasive products*. In the same period they have achieved *235 product improvements*. This process is continuous—BEHR-MANNING research never stops.

TO MAKE SURE that your sanding and finishing methods are *right* for your needs, utilize the BEHR-MANNING Methods Room located nearest you. Take advantage of the abrasive engineering experience available there, without obligation. Try out the latest abrasive methods on your own work.

Full details on this free service, and location of Methods Room nearest you, are covered in the book, "Proving Ground for Production." Write for your copy today. Address Dept. PF-9.

TROY, N. Y. DIVISION OF NORTON COMPANY

STONES · PRESSURE-SENSITIVE TAPES

EXPORT: BEHR-MANNING OVERSEAS INC., NEW ROCHELLE, N. Y., U. S. A.

FREE

ASK FOR BOOKLET No. A-9

IF YOU PRODUCE PARTS THAT REQUIRE FINISHING OF ANY KIND

This 22-page booklet is *guaranteed* to open your eyes! It gives you the inside story of advanced barrel finishing as *never told before!*

In the last five years, barrel finishing has made rapid advances. Only those directly connected have been able to keep up. *Only 30%* of the nation's manfacturers are benfiting from the tremendous cost savings and improved finishes made possible by these advances.

Now is the time to investigate this labor-saving, cost-cutting method. ALMCO barrel finishing equipment has completely paid for itself *in as little as two months!* This is easy to understand. A single unit installation replaces from two to twelve men. Savings run as high as 95%.

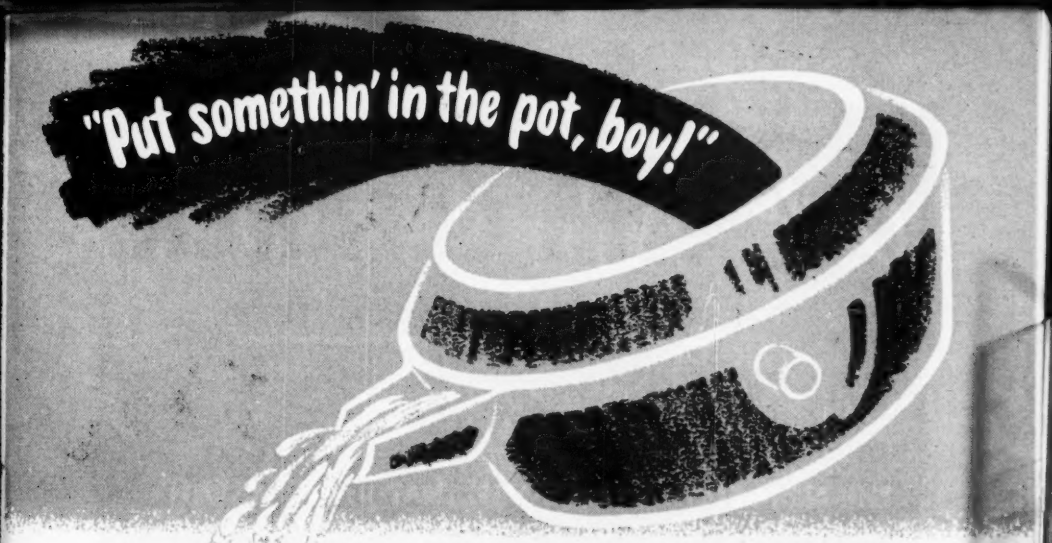
"Advance Barrel Finishing" is the only mass deburring, grinding and finishing method where results are *controlled.* Amazing results are now possible on almost all types of parts from large castings to small intricate parts. Close tolerance parts can be finished with absolute uniformity to almost any desired micro-inch reading.

WRITE TODAY FOR YOUR *FREE* COPY

ALMCO Supersheen

AMERICA'S LARGEST MANUFACTURER OF ADVANCED BARREL FINISHING EQUIPMENT — MATERIALS AND COMPOUNDS

ALBERT LEA, MINNESOTA



. . . and get NEW ANODES from YOUR NICKEL SCRAP

You can *beat* the nickel famine!

Dig into that nickel mine in your scrap bins. Send us those ends, swords, stubs — any nickel anode scrap. We'll cast *your own metal* into *new* oval anodes, drill and tap for hooks and ship to you pronto. You paid for this metal; why not use it? It represents a reliable source of nickel at this time and the cost of re-conversion is low. Wagner Brothers, Inc., has installed the finest melting and casting equipment available and your metal is processed under stringent metallurgical control. We're centrally located, easily reached at low transportation cost.

To handle a large volume of metal efficiently, we recommend a standard ordering and shipping procedure. Just fill out the coupon in detail and we'll send full directions for packing and shipping, and quote on any quantity.

Wagner BROTHERS INC.

432 MIDLAND · DETROIT 3, MICH.

We have electrolytic nickel anode scrap for re-conversion.

Stubs, average length _____ inches
Weight (less hooks) _____ pounds

Swords, average length _____ inches
Weight (less hooks) _____ pounds

Shipment can be handled in

☐ Strapped bundles ☐ By Rail
☐ Drums ☐ By Truck

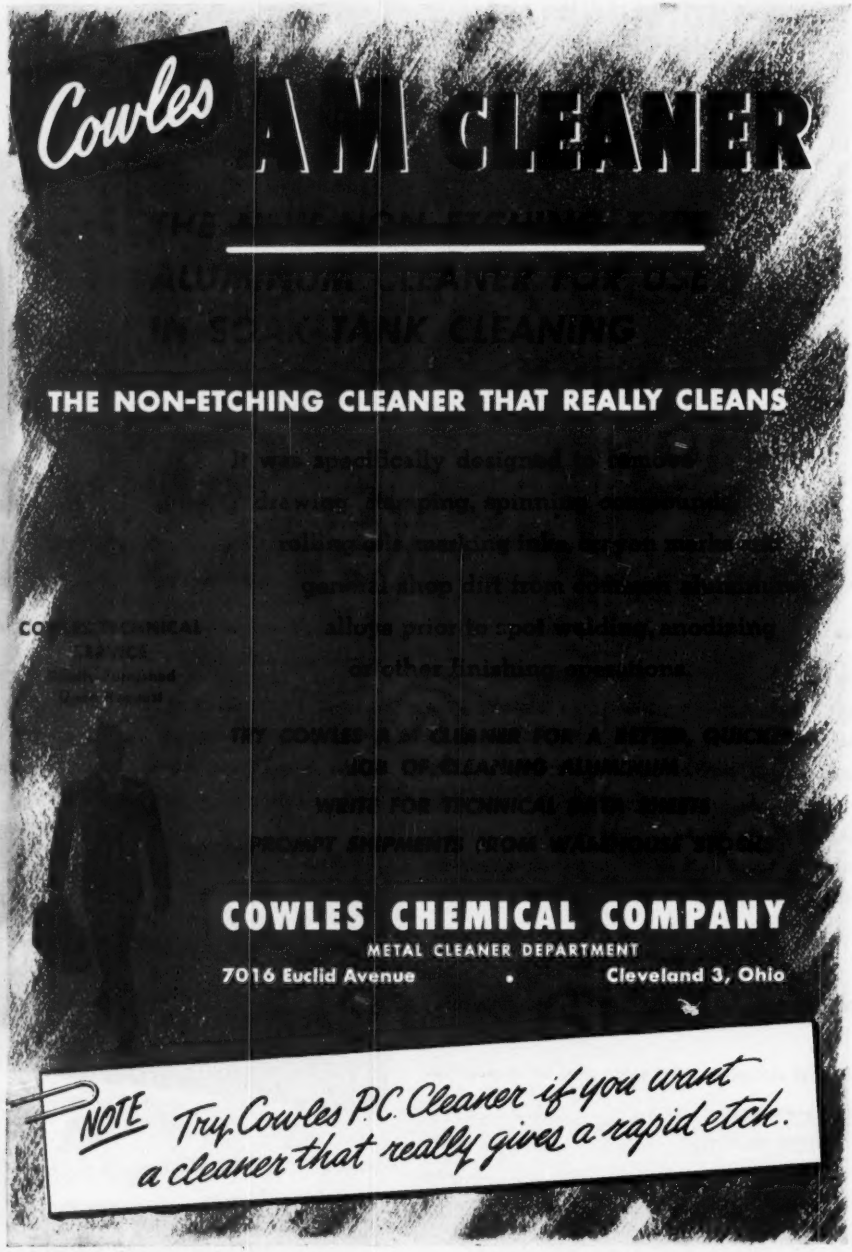
NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____


Cowles
CLEANER
THE NON-ETCHING CLEANER THAT REALLY CLEANS
COWLES CHEMICAL COMPANY
METAL CLEANER DEPARTMENT
7016 Euclid Avenue • Cleveland 3, Ohio
NOTE Try Cowles P.C. Cleaner if you want a cleaner that really gives a rapid etch.

editorial

Vol. 15, No. 12

SEPTEMBER, 1951

Control Stream Pollution; Save Plating Solutions!

The Metal-Finishing Industry Action Committee of the Ohio River Valley Water Sanitation Commission has just issued a guidebook entitled "Plating-Room Controls for Pollution Abatement." This concise, fact-packed manual tells the plating room operator a few simple, practical principles to follow in reducing the flow of stream-contaminating chemicals out of the plating room. When chemical waste is reduced, operating cost reduction follows.

Actually the guidebook goes farther, since the practices it recommends will have the result of making platers more conscious of shop cleanliness as well as stream cleanliness. The plater has long been criticized, condemned, or ignored, as the case may be, because plating shops are not all as neat and sparkling as might be desirable. Now, an easy-to-understand booklet shows "how" to improve shop operation (and appearance) as well as "why."

The plater may well comment that the suggestions offered are not new. Certainly they represent only those practices dictated by common sense and sound shop operation. However, now for the first time the plater can refer to a single easily-understood reference book, not only to remind him to make use of the principles and practices of which he has some knowledge but also to offer him definite operating details showing him how to "cash in" on the operating practices in question.

A manual of this kind fills a definite need in the electroplating industry; it represents constructive, progressive action by an industry group.

To achieve the advantage of lower operating cost, conservation of scarce plating chemicals, good housekeeping, and reduction of water contamination, the plater must accept the principles proposed, "use what is known," and make the several suggested practices a part of his daily shop operation.

Pickling for Porcelain Enameling

I. The Spray Pickling Process at Kaiser Metal Products, Incorporated

Before steel can be successfully coated with porcelain enamel, the metal must be thoroughly cleaned, pickled in an acid solution to remove rust and form a uniformly etched surface, coated with a thin film of nickel, and neutralized in suitable alkalies. The mechanical and chemical means of accomplishing this surface treatment are not identical in each plant. In this two-part article are presented two modern methods of preparing steel for porcelain enameling.

By EZRA A. BLOUNT
Editor

PF FEATURE

In the $2,000,000 enameling plant of Kaiser Metal Products, Inc., Bristol, Pa., sink tops and bathtubs are formed from 14 gauge steel and finished in acid-resisting fused-on porcelain enamel at the rate of 180 per hour. Such a rate of manufacture requires a highly mechanized operation, and in the 60,000 square foot enameling plant at Kaiser every effort has been made to facilitate production and create a controlled, streamlined process flow.

The enameling plant at Kaiser is located across the street from the main fabricating plant, and connected with it by an enclosed overhead chain conveyor. Formed products, such as sinks, are hung on the conveyor and travel from the press room in the main plant to the enameling plant. Upon entering the enameling plant, the formed products must be cleaned of all oil, grease, dirt, drawing compound, rust or surface oxides, and given a surface etch to make possible successful porcelain enameling. It is the function of the spray pickling process to properly condition the steel surface for enameling.

Parts entering the enameling plant are brought by the transport conveyor to a transfer station and hung on the conveyor which carries them through the automatic spray pickling machine. Figure 1 shows the sink tops entering the machine, which was designed and built by the R. C. Mahon Company of Detroit.

The automatic spray pickling machine is an enclosed tunnel, 147 feet 6 inches long, divided into eight processing sections (and a number of rinse and drain sections) through which steel

parts pass for treatment. The tunnel opening is approximately 4 by 8 feet. As can be noted in Fig. 1, parts are carried through the spray pickling machine by an overhead chain conveyor on offset hooks. These hooks pass through an overhead water-filled trough and baffle extending the entire length of the machine. This feature serves as a seal to keep spray, fumes, and steam in the tunnel. Air seals at tunnel entrance also help in keeping objectionable fumes out of the plant. Figure 2 shows the exhaust hoods which remove excess steam and fumes; thus, air flow is "in" at the pickler openings, rather than "out", further controlling pickling fumes.

Spray Pickling Process

Moving at the rate of 5 ft./min., sink tops and other parts are cleaned and pickled by a series of solutions which are sprayed from nozzles mounted on vertical pipes inside the machine tunnel. Time of contact, solution temperatures, and other details of the various stages of the process are as follows:

1. Clean for 1 minute with an alkali emulsion cleaner operated at 160 deg. F. This solution is circulated through 96 spray nozzles by a 650 g.p.m. pump from a 1,300-gallon storage tank. The solution is heated by two direct-fired gas burners. All temperatures are thermostatically controlled.
2. Drain for 1 minute (approx.).
3. Rinse—cold water spray curtain. (Single row of 16 spray nozzles)
4. Drain 1 minute.
5. Alkali clean for 1 minute at 180 deg. F. Other details of this stage are the same as in Stage 1.
6. Drain.
7. Rinse—cold water spray curtain.
8. Drain.
9. Cold water rinse for 1 minute. This solution is circulated from a storage tank through 80 spray nozzles by a 375 g.p.m. pump. This section of the tunnel, as well as the storage tank, is rubber lined. Piping is constructed of Monel.
10. Rinse—cold water spray curtain.
11. Drain—1½ minutes.
12. Pickle for 3 minutes in 8 per cent sulfuric acid at 160 deg. F. This solu-

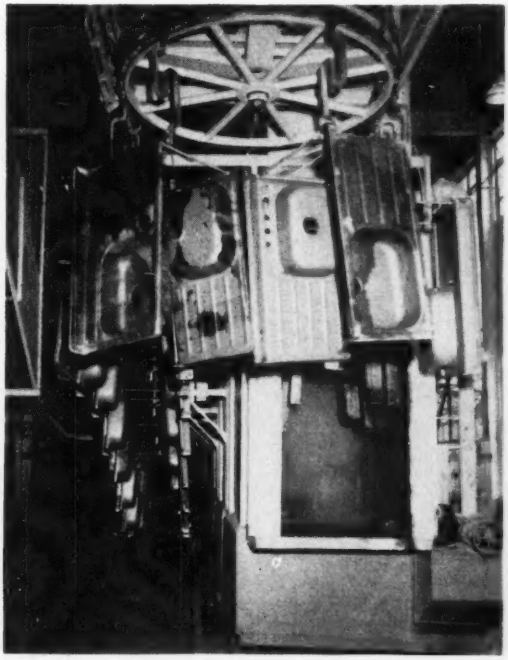


Fig. 1—Suspended by offset hooks from the overhead chain conveyor, sink tops enter the Mahon spray pickling machine for cleaning and pickling. As can be noted in the illustration, the condition of the metal surface leaves much to be desired. As steel for enameling purposes becomes more critical, this condition may become more serious, thus placing a greater burden on the pickling machine in that the imperfections on the surface must be removed so that a quality enameled product will result.

tion is sprayed through 256 nozzles and circulated from a 2,000-gallon storage tank by two Duriron pumps of 400 g.p.m. capacity. Storage tank and tunnel are rubber lined; lead piping is used inside and out; the solution is heated with steam conducted through stainless steam coils. Figure 3 presents a view of the pumps, piping, storage tanks, and controls located outside the spray tunnel of the pickling machine.

13. Drain—1 minute.

14. Rinse—cold water spray curtain.

15. Drain—1 minute.

16. Cold water rinse for 1 minute. Other details are the same as Stage 9 (above) except that a 375 g.p.m. Duriron pump is employed.

17. Rinse—cold water spray curtain.

18. Drain—1½ minutes.

19. Spray with nickel solution for 5 minutes. The nickel solution contains between 2.0 and 2.5 oz./gal. nickel sulfate and is held to a pH between 2.8 and 3.0 and a temperature of 175 deg. F. This treatment forms an "immersion" nickel coating (0.04 to 0.08 gram of nickel per square foot of surface) on the enameling iron. The nickel solution is sprayed from 416 nozzles and circulated from a 3,000-gallon storage tank by two Duriron pumps of 750 g.p.m. capacity. The solution is heated by means of Monel steam coils, and the storage tank, tunnel section, and piping are all made of Monel. The solution is filtered continuously through an Industrial filter to remove the iron sludge formed during this chemical process.

20. Drain—1½ minutes.

21. Rinse for 1 minute in a sodium cyanide neutralizing solution. The solution contains approximately 0.32 per cent sodium cyanide, and is held to a

Fig. 2—A view of the top of the spray pickling machine showing exhaust duct work, piping, and conveyor arrangement.

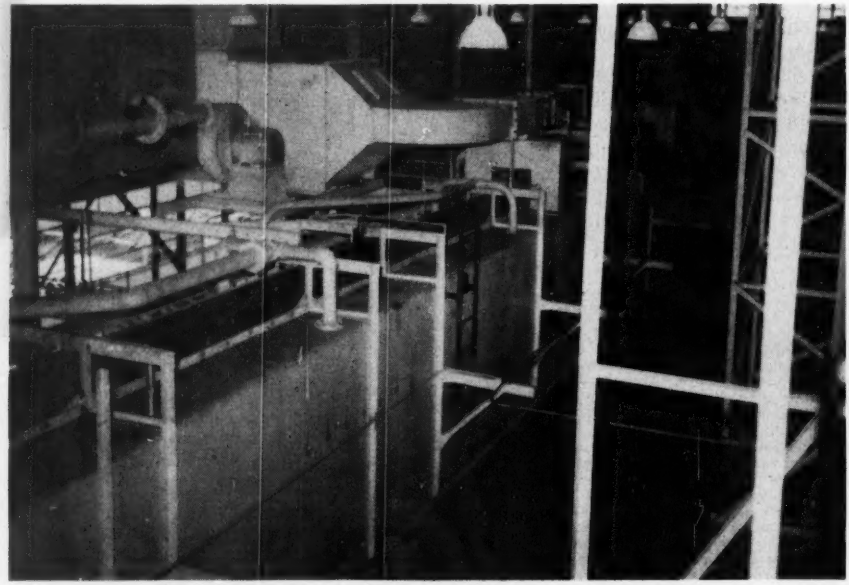
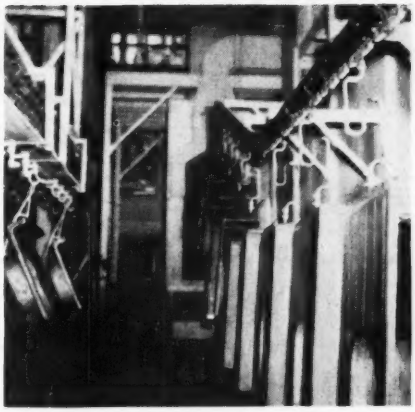


Fig. 4—Cleaned and pickled sink tops emerge from the drying oven, which is the final stage in the pickling cycle. At the left can be seen the enamel spray chain illustrating that the plant has been designed with a view to compactness and a minimum of material handling. The sink tops need only be transferred from the chain shown on the right to that shown on the left to continue through the porcelain enameling process.
(Photos by PRODUCTS FINISHING)

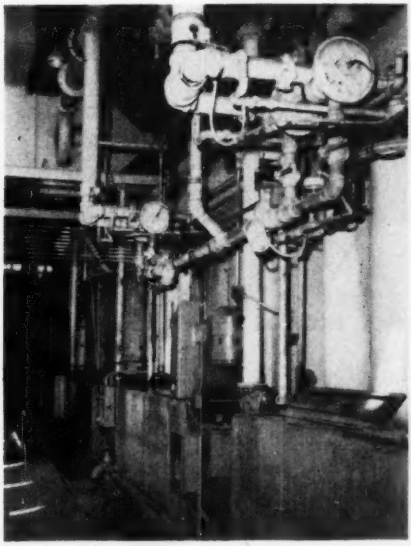


pH of 11.2. The solution is filtered continuously. Two direct-fired gas heaters are used to maintain a temperature of 170 deg. F. A 475 g.p.m. pump circulates this solution from a 1,000-gallon storage tank. This section of the pickling machine, as well as the accessory tanks and piping, is constructed of steel, and not rubber lined.

22. Drain—1½ minutes.

23. Neutralize for 1 minute with a soda-borax solution operated at 180 deg. F. Equipment details for this stage are the same as for Stage 21 (above).

24. Drain—1½ minutes.



A 20-foot, U-turn type, gas-heated drying oven is connected to the end of the spray pickling machine. Ware to be enameled emerges from the dryer clean and dry (see Fig. 4) ready to be transferred to the first spray chain conveyor, there to receive the first coat of porcelain enamel.

Maintenance Notes

All cleaning solutions and neutralizers are discarded weekly; the nickel solution is dumped twice per week. A daily chemical check is made to keep solutions up to standard. Discarded solutions and rinse water are processed through a waste disposal system to avoid stream pollution.

Equal care is exercised with regard to possible air pollution by exhaust fumes. Water from the alkali rinse tank is introduced into the exhaust from the sulfuric acid stage to neutralize the acid fumes.

Fig. 3 — This view of one side of the spray pickling machine shows in more detail the gas control valves, pumps, and recording temperature controllers, all of which serve to ensure correct functioning of the machine at all times.

ANNOUNCING THE *NEW*

Ransburg

NO. 2 *Electrostatic* PROCESS

AN *Amazing* DEVELOPMENT IN SPRAY PAINTING

IN MANY INSTANCES THE EFFICIENCY EXCEEDS **99%!**

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

WHAT IS THE RANSBURG No. 2 PROCESS?

It's the most revolutionary improvement ever developed in spray painting. It's electrostatic atomization and electrostatic deposition.

On most production lines, the No. 2 Process gives 25% to 75% more pieces per gallon than any other spray finishing system. And, the increase will be much larger over conventional hand spray methods.

- **NO OVERSPRAY TO BE EXHAUSTED!**
- **NO COMPRESSED AIR USED!**
- **NO OPERATOR SKILL REQUIRED!**

- **Write for a copy of our brochure describing the No. 2 Process in more detail, and including case histories of early installations where the No. 2 Process has been proven in production.**

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

Pickling for Porcelain Enameling

II. Pickling with Troxide at the Estate Stove Company

Steel range and heater parts are cleaned and pickled prior to porcelain enameling in a series of tanks arranged for efficient handling and straight-through flow. Acid sulfate salts, known as Troxide Compounds, are used instead of sulfuric acid in one step of the process.

By FRANK L. BONEM
Associate Editor

THE Estate Stove Company, division of Noma Electric Corporation, Hamilton, Ohio, was first established as a foundry in 1812. In 1886 it entered the gas range manufacturing field as one of the three stove manufacturers then in business. The company now occupies eighteen buildings, covering three city blocks and providing a total floor space of 12½ acres. Its 850 workers, many of them old-timers, produce 225 gas ranges, 125 electric ranges and between 75 and 100 gas and oil heaters in an 8-hour day.

The manufacturing process is carried out on mass production lines, liberal use being made of conveyors. Since a great many parts contained in a stove or range are finished in porcelain enamel, the enameling operation is a key factor in range production. Just as important to the enameling operation is the cleaning and pickling process which prepares the steel parts, formed from 20-gauge enameling stock, for the porcelain enamel. Pickling facilities, therefore, need to be efficient from the quality standpoint and also from the production standpoint in order to keep pace with mechanized porcelain enamel and assembly operations.

Cleaning and Pickling Process

Recently the Estate Stove Company completed a new pickling installation designed to accomplish the two objectives mentioned in the preceding paragraph. The installation consists of a series of nine tanks installed in a straight line with the loading area conveniently located adjacent to the welding department (in which final operations on the formed parts are accomplished), and the unloading area at the opposite end of the pickling installation located near the first enameling (or ground coat dipping) operation. Metal parts are loaded into large Monel baskets and transferred from tank to tank by two electric hoists suspended from and traveling on an overhead "I" beam. (See Fig. 1) Range and heater parts to be porcelain enameled arrive at the pickling room coated with shop dirt, drawing compound, oil and, to a certain degree, rust and scale, part of which may have been produced by some of the welding operations. The process employed to remove these surface imperfections and deliver clean metal parts to the ground coat enamel dip tank is as follows:

(1) Unload from trucks or dollies and load into Monel baskets.

(2) Submerge for six minutes in a solution of MacDermid's Metalex cleaner operated at 212 degrees F. (A six-inch frame has been constructed in the bottom of this tank so that baskets may rest upon the frame and hold the parts to be cleaned out of any sludge accumulation which might be found on the bottom of the tank.)

(3) Rinse in hot water (160 degrees F.) for six minutes.

(4) Clean in a solution of Metex 19W cleaner operated at 212 degrees F. for six minutes.

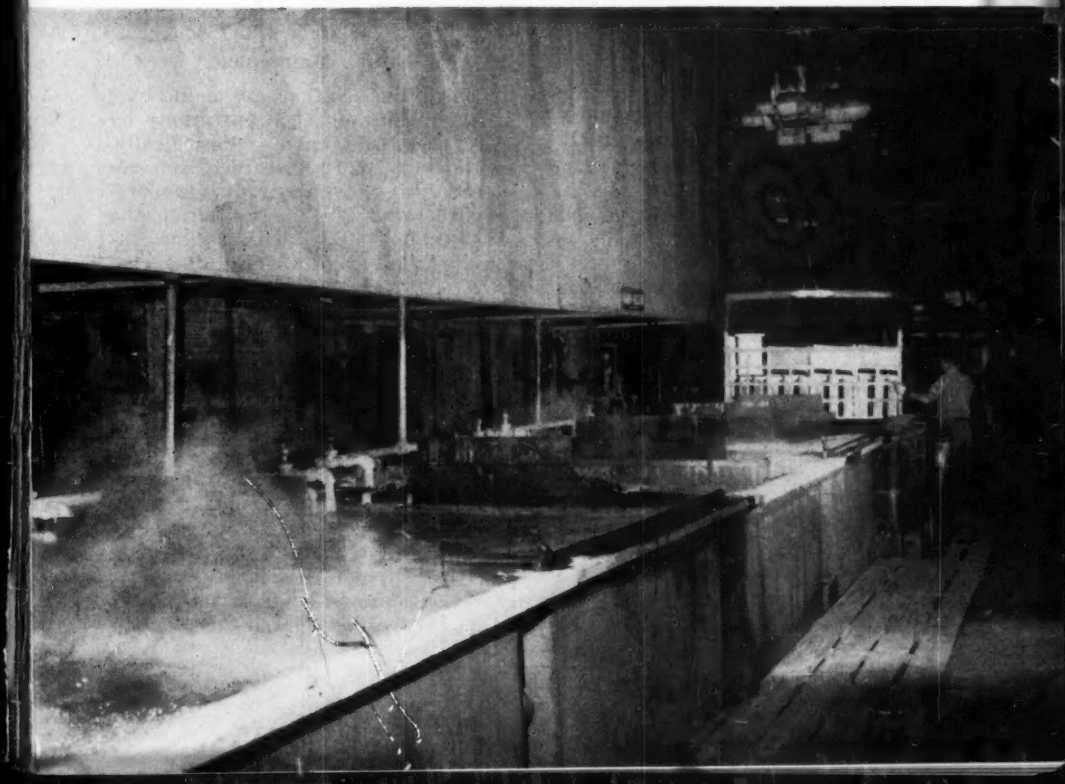
(5) Rinse in boiling water for six minutes.

(6) Pickle in a solution of 7 ounces per gallon (maximum—24 ounces per gallon) of Troxide E, a compound composed of acid sulfate salts held at a temperature of 155 degrees F. for twelve minutes. (Since the time for this operation is twice that of all the others, two tanks are employed for pickling, thus keeping the entire process "in step".) Figure 2 shows a load of pickled ware being removed from one of the Troxide tanks.

(7) Rinse in cold running water for six minutes.

(8) Immerse for six minutes in a solution of 1 to 1½ ounces per gallon of nickel sulfate operated at a temperature of 155 degrees F. and at a pH of

Fig. 1—A view of the pickling department showing the line of pickling tanks and the partition installed behind the tanks to assist in fume removal. The first cleaner tank may be seen in the left foreground. The two electric hoists, one of which may be seen in use in transferring a basket of ware, are of 4,000 pound capacity.



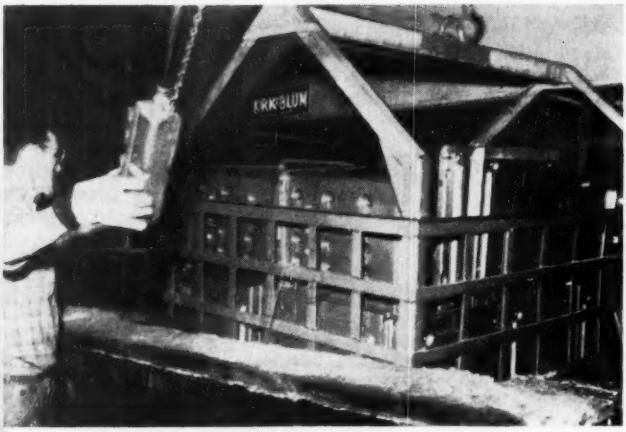


Fig. 2 — A close-up view showing how an all welded Monel basket loaded with ware is handled during transfer from one processing tank to another.

3. During the immersion period, a coating of 0.05 mil of nickel per square foot is deposited. The nickel solution is filtered continually through a 500 g.p.h. Industrial filter which may be seen in the left background of Fig. 3. Following sound filtration practice the filter intake is located near the bottom of one corner of the tank and the return is located near the top of the solution, diagonally opposite from the intake, thus providing conditions for the maximum amount of solution circulation.

(9) Rinse for six minutes in cold running water.

(10) Neutralize in a solution of soda ash and borax, operated at 165 degrees F., for six minutes.

Baskets are removed from the neutralizing solution, placed on dollies and pushed into the Kirk & Blum dryer which can be seen in the right background of Fig. 3. The last traces of moisture are removed from the steel parts in this gas-fired circulating hot air oven thermostatically controlled to operate between 230 and 240 degrees F. The steel parts require eighteen minutes to dry thoroughly. The oven holds three baskets at a time so that this operation is timed exactly to the rest of the cycle. At the end of the drying operation the steel parts are unloaded onto an overhead transport conveyor which carries them to the ground coat dip tanks.

The pickling department operates on two shifts or sixteen hours per day and requires the services of two operators per shift. Normally, between 25,000 and 26,000 square feet of ware to be porcelain enameled are processed. This is equivalent to a production rate of 390 to 410 square feet per operator per hour.

Solution Maintenance

The various solutions are maintained at their optimum concentrations by daily chemical analysis. Periodically, solutions must be discarded and replaced. Also, once each week it is necessary to remove the sludge from the first cleaner tank. Each solution containing MacDermid's Troxide E (the two pickling solutions) is discarded after about eight months of use or when the iron content reaches 3 per cent. However, the solution can be used till the iron content has reached 5-6 per cent.[1] Thus, the frequent changing of acid solutions, which is necessary when sulfuric acid is used, has been eliminated in this process. Other advantages described by the supervisor included improved pickling room safety and decreased cost of maintenance.[2] Special safety equipment, such as rubber gloves, aprons and boots, is not required for use by operators in this pickling

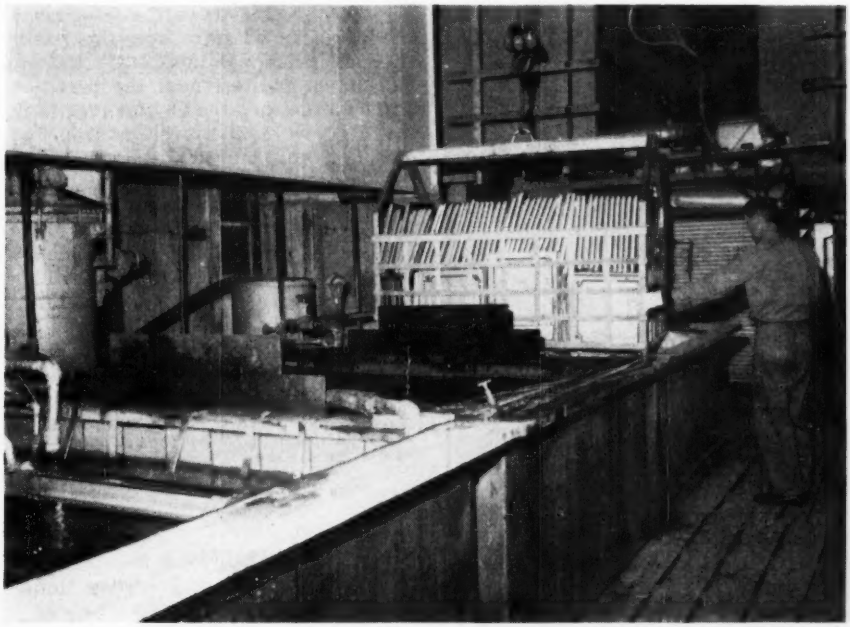
room since there is no handling hazard in the use of the acid sulfate salts.

Pickling Room Equipment

The tanks containing the various solutions described are approximately six feet square with a capacity of 1300 gallons each. As can be noted in the accompanying illustrations, the tanks are installed in a pit below the normal floor level. Further, they are pitched slightly to the rear of the pit to facilitate draining. To improve the appearance of the installation the steel tanks are painted on the outside with a primer coat of Permolite followed by a green finish coat. The corrosion resistance of this combination is reported to be excellent so that the coating need be renewed only once a year. Most of the tanks are unlined. The two tanks containing the Troxide solutions, the rinse tank which follows, and the nickel tank are lined with acid-proof brick.

A thin perpendicular metal barrier is constructed on one side of each tank so that baskets may be removed from the tank, one side of the basket rested on the barrier, and the basket tipped with the aid of the hoist to allow more perfect drainage of the solution back into the tank. Water pipes, in which a number of small holes have been drilled, are located along the front side of each tank. Water sprays horizontally from these apertures constantly, washing any impurities on the solution surface to the rear of the tank and out over

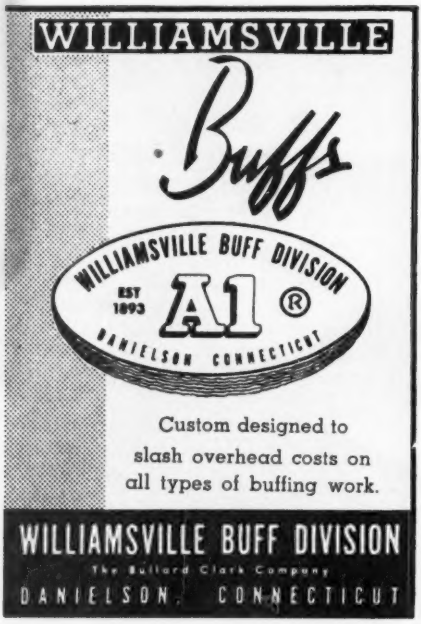
Fig. 3—In this photo one of the tank operators can be seen lowering a basket of ware into the neutralizer tank, the final step in the process. The filter used for continuous filtration of the nickel solution can be seen in the left background, and the drying oven can be seen in the right background. The vertical steel rests erected on each tank to facilitate draining of each basket of ware may be noted on two tanks in this photo.
(All photos by PRODUCTS FINISHING)



the overflow dam. An equally important function of the spray is that of giving the parts in process a final clean rinse as they emerge from the rinse tank in question.

Temperatures of hot solutions are maintained with the aid of Platecoil steam heaters installed at either side of the tank in question. Steel Platecoils are employed in the alkaline solutions or hot water tanks and Monel Platecoils are used in the Troxide and nickel tanks. As can be anticipated, the installation of a heating element on either side of a tank results in excellent circulation of the solution and an even temperature throughout the tank. It has been found practical for one of the pickle room operators to check temperatures periodically with a hand thermometer, and then open or close steam valves to adjust temperatures to the proper operating level.

Plant engineers have found that particular care must be taken in designing an exhaust system for pickle rooms, if desirable results are to be obtained. Large surface areas of several hot solutions provide annoying quantities of steam and miscellaneous fumes which must be removed in the interest of operator comfort and efficiency. A particularly effective ventilating system has been installed in the plant of the Estate Stove Company. Four 48-inch diameter fans have been installed along the wall opposite the operating area of the pickle room. Each fan has a capacity of 40,000 c.f.m., from which it can be seen that rapid air movement through this area can be obtained. Vertical stacks carry the fumes into the outer air where they can be dissipated. These stacks, like the pickling tanks, are protected from corrosion and provided with attractive appearance through the use of primer and finish coats of Permalite. The air flow and fume removal is made even more efficient through the use of a partition extending from the ceiling to a point about seven feet above the floor level. Figures 1 and 3 show how this partition has been installed. Since the air velocity is greatest near the partition and opposite the area in which the tank operators work, all movement is in that direction and fumes are removed before they can become objectionable. In addition to the improvement of operator comfort, the prompt and complete removal of fumes further saves money in reducing hoist maintenance, which in the presence of acid fumes or moisture becomes a serious problem.

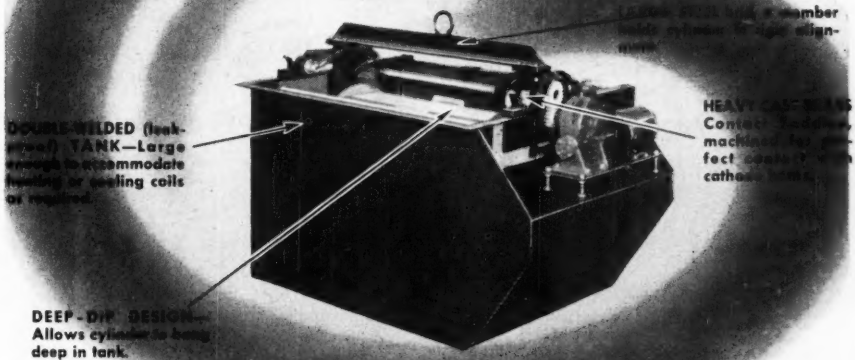


[1] If this pickling solution is filtered, it can be used for two years.

[2] For a further discussion of pickling with Troxide see "Pickling Sheet Steel Prior to Porcelain Enameling," by Thomas F. O'Brien, "Better Enameling," Dec., 1949.

The whole of science is nothing more than a refinement of everyday thinking.—*Albert Einstein.*

ONLY Udylite PLATING BARRELS GIVE YOU ALL THIS . . .



DOUBLE-WELDED (leak-proof) TANK—Large enough to accommodate heating or cooling coils as required.

DEEP-DIP DESIGN—Allows cylinder to hang deep in tank.

and Savings, too!

No other plating barrel can match the Udylite Barrel in QUALITY, EFFICIENCY and DURABILITY. Udylite Barrels plate the work—not the cylinder. Electrical insulation is arranged so that ALL the current flows directly to the work pieces. Cathode leads are encased in unbroken insulation . . . panels cannot absorb solution . . . there is no possibility of any element of a Udylite Barrel diverting current from the work being processed.

This not only results in faster, more uniform plating but also gives a substantial savings in current consumption.

On the basis of actual service records, the Udylite Plating Barrel lasts longer and produces more work with lower operating and maintenance costs than any barrel built! Ask your Udylite Technical Man about it. Or write *The Udylite Corporation, Detroit 11, Michigan,* for full details. There's no obligation.

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

CIVILIAN PRODUCTION

DEFENSE ORDERS

SHERWIN-WILLIAMS
INDUSTRIAL FINISHES

KEMCLAD
•
SUPERCLAD
•
KEMVAR
•
TV LACQUERS
•
HEETCLAD
•
KEMWOOD PRODUCTS
•
DIMENSO

the same dependable source for

• FINISHING MATERIALS
• FINISHING KNOW-HOW

Whether you are buying finishes to meet defense specifications or your own civilian requirements, you can simplify the job . . . find dependable help on special needs . . . eliminate troublesome problems . . . through The Sherwin-Williams Industrial Division with its wealth of know-how and background, both in civilian and wartime experience.

This broad background provides the same extra advantage of experience in Sherwin-Williams finishes supplied to meet military specifications—whether for wood, metal or other surfaces—as in the S-W finishes well known for many years for civilian production, such as Kemclad, Superclad, Kemvar and TV Lacquers. This experience is available wherever you may be, through facilities extending from coast to coast. Call, wire or write The Sherwin-Williams Co., 101 Prospect Ave., N. W., Cleveland 1, Ohio.

SHERWIN-WILLIAMS
INDUSTRIAL FINISHES

TOUGH AND MARPROOF—Kemclad formulations include special ingredients to protect finish against marring, chipping or scratching.

HOT GREASE? NO HARM DONE! — Even hot grease won't damage Kemclad's gleaming white finish!

STAYS WHITE AND STAIN-FREE! — Kemclad Finishes aren't affected by food acids, weak alkalies, alcohols or other common household chemicals.

CLEANS EASILY...SAFELY! —Kemclad's smooth surface cleans easily with damp cloth, but withstands strong detergents safely.

Photo courtesy Gibson Refrigerator Co., Greenville, Michigan

Well engineered...

TO THE LAST 2/1000 OF AN INCH!

The engineering in the last 2/1000 inch of an appliance—its *finish*—may be even more important than for many of its other parts! Leading manufacturers like Gibson Refrigerator Company prefer S-W Kemclad Appliance Finishes because they provide advantages three ways:

- ***Saleswise*, they give the white-for-the toughness and beauty that only the newest developments in synthetic resin materials and know-how make possible.**
- ***Productionwise*, they reduce rejects and production line problems.**
- ***Costwise*, their high solids content with low viscosity makes finishing cost low for any given thickness of finish.**

Investigate what S-W Finishes may mean in your own production set-up! Call, wire or write The Sherwin-Williams Co., Industrial Div., Cleveland 1, Ohio.

SHERWIN - WILLIAMS
APPLIANCE FINISHES

Conversion Coatings and Specification Finishes

By C. O. HUTCHINSON
Technical Service Director
Nubian Industrial Division, The Glidden Company

MANY informative articles have been written on the preparation of metal surfaces for painting. These articles describe in sufficient detail theories, purposes, and practices in metal preparation systems for use on various metals.

A discussion of conversion coatings can be approached from many viewpoints:

a. Type of metal, such as steel, aluminum, zinc, magnesium.
b. The steps in the process—from one to seven stages.
c. End result desired.

Properties of Surface

Some years ago an effort was made to define the condition of a metal surface suitable for painting without reference to the process or products to be used in accomplishing this result. At that particular time (the early 1940's) there was considerable attention being given to the Four Freedoms of Human Beings. It might be appropriate to set up the Seven Freedoms of Good Metal Preparation—namely:

1. Freedom from oil or grease.
2. Freedom from smut.
3. Freedom from rust.
4. Freedom from water.
5. Freedom from acids other than chromic or phosphoric.
6. Freedom from alkali.
7. Freedom from excessive water soluble salts.

This work resulted in the writing of a specification which is now in use by various government agencies and is known as JAN-C-490.

There are various degrees of perfection required for the Seven Freedoms, depending on:

a. The exposure conditions required for the finished article.
b. The type of paint system to be used.
c. The economic and production factors.
d. The type of metal surface.

It has often been said that a steel surface ready to paint is also ready to rust; conversely, a steel surface which will not rust rather quickly under mild corrosion conditions, such as humid atmosphere, is not ready to be painted.

Conversion Coatings on Treated Steel Surfaces

In addition to the Seven Freedoms, there are other positive factors that can be used to describe surfaces ready to paint. The phosphate coating industry has gained considerable recognition in many industries and government agencies. In a general way, the use of a conversion coating and parti-

cularly the forming of zinc, manganese, and/or iron phosphate complex or simple coatings on the surface of iron or steel can more than double the service life of most industrial organic finishes. The home appliance and automotive industries have almost completely converted to the use of phosphate coatings on iron and steel parts to improve the life of the paint finish.

Other phosphate and oxide coatings on iron and steel include the use of heavy phosphate coatings with or without supplementary organic materials. In the field of oxide coatings with or without supplementary organic coatings, U. S. Army Specification 57-0-2 provides a good basis for evaluating or specifying the use of zinc or cadmium plating with or without the supplementary treatment.

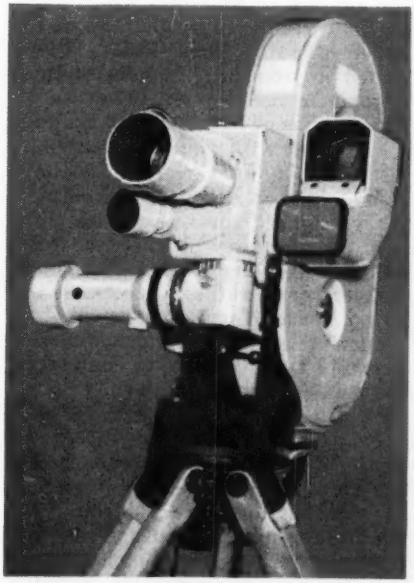


Fig. 1—A 35 mm. A-6 combat motion picture camera finished with various conversion coatings and specification finishes.
(Photo courtesy Bell and Howell Co., Chicago, Ill.)

C. O. Hutchinson

C. O. HUTCHINSON is the author of many specifications for paints, varnishes, lacquers, metal preparations, and related products. He is a member of the American Chemical Society, American Society of Corrosion Engineers, and a registered professional engineer in the State of Illinois.

While it is true that some of these black oxide coatings on steel can produce what appears from normal handling to be a reasonably corrosion-resistant finish, it is difficult, if not impossible, to produce a much greater degree of corrosion protection than required as a minimum to meet this specification.

The phosphate coatings described in this specification are Type II, Class A and B—a very heavy phosphate coating with supplementary organic protection, and Class C—the same quality as required by JAN-C-490, Grade I. Specification 57-0-2 describes under Type III oxide coatings produced by immersion in hot alkaline oxidizing solutions or hot chromate solutions or fused dichromate salts.

Conversion Coatings on Non-Ferrous Metals

Aluminum is the most common industrial non-ferrous metal requiring a

conversion coating before the application of a quality finish. Prior to the present Korean situation, considerable quantities of sheet aluminum were being used in the fabrication of consumer goods. Of course, at the present time, there are great restrictions on the use of aluminum because of the demand for stock piling and for defense use of this light metal.

Fig. 2—A 15 mm. militarized PH-431-B motion picture camera finished with conversion coatings and specification finishes.
(Photo courtesy Bell and Howell Co., Chicago, Ill.)

There are two types of conversion coatings used on aluminum to prepare it for painting—oxides and phosphates. The oxide coating can be applied either electrolytically or chemically. Phosphate coatings may be applied chemically either in spray-type power washers or in immersion systems.

Anodizing is the process of applying a thin oxide coating to the surface of aluminum through electrolytic action. There are a wide variety of detailed processes for anodizing aluminum to vary the color and thickness, and density of the oxide coating produced. It is even possible to dye or otherwise color this oxide coating to produce decorative effects on the aluminum when supplementary organic finishes are not to be used as final coatings.

It is also possible to apply a phosphate coating to aluminum in power washers similar to those described in the "Steel" section. These processes are in large commercial use at the present time and do an effective job of preparing the aluminum for supplementary organic finishes.

There are also a variety of wipe-on type phosphate materials, supplied by various manufacturers, to clean and coat the surface of aluminum to improve paint adhesion. As might be expected, however, these easy-to-apply, simple processes, such as the wipe-on treatments, do not produce the same degree of surface conversion or adhesion improvement that is produced by the five-stage washer systems.

Zinc surfaces, either as galvanized iron or zinc plated parts or die castings, also require the use of conversion coatings in order to passivate the surface, provide a "tooth" for organic films, and prevent the reaction between zinc and the organic film which automatically results in serious loss of adhesion of paint films. Zinc may be treated to produce phosphate coatings through the use of power washers, dip tank systems or hand wipe-on coatings as is the case with steel and aluminum.

Chromate-type conversion coatings are also used on zinc plate and on some zinc galvanized surfaces. These chromate coatings vary in color and composition depending on the intended use, and were given rather wide-spread use during World War II through the development of an olive drab colored chromate type conversion coating on zinc plated ammunition parts.

Terneplated iron is sometimes used on industrial products requiring a paint coating of good, durable characteristics. The use of a power washer and an oxalate type coating has been found very helpful. The oxalate coatings have not found very wide-spread industrial use probably because terneplate is not a very popular metal in peace time operations.

Table I lists the major metal preparation or conversion coatings spe-

cifications currently in use by defense agencies on iron and steel parts. Table II lists the Government specifications describing metal preparation or conversion coatings on non-ferrous metals. The meeting of the various requirements of these specifications could establish a starting point for determining the quality of metal preparation that is desirable.

Specification Finishes

There has been a continuous evolution on the part of Government agencies towards greater and greater detail and more restricted specifications for paint materials as well as other products. Paint supply firms are faced with the necessity of assigning large numbers of research and formulation men to the task of developing products to meet these specifications.

The increasing use of the prior approval or qualifications lists, while highly desirable from a quality viewpoint, increases the overhead cost in the paint industry tremendously. While this is a worthwhile program and contributes greatly to the improving of the quality of paint finishes used on government items, it is desirable that the paint users recognize that paint manufacturers may have from one to perhaps six men working for periods up to six or eight months in the developing, testing and searching for the right combination of the various ingredients required to meet the rigid requirements of these specifications.

Once a product has been found which meets the requirements and which the Government Laboratory approves, then paint manufacturers must adhere to that particular formula and cannot pass along to its customers any improvement in combination of materials, manufacturing methods, and so on, until they have also shown to the satisfaction of the Government Laboratory that these products are capable of meeting the requirements of the specification.

Fig. 3—Blitz can finished with conversion coating and specification finishes. *(Photo courtesy Russakov Can Co., Chicago 15, Ill.)*

Table III is a tabulation of the essential paint items used on the major government purchases of products for defense purposes, as the requirements exist at the present time. This tabulation is, of course, subject to change.

While the number of specifications referred to in Table III does not appear to be excessive, these are simply the major items. There are many more items than those shown in the tabulation.

You might well ask what is the best procedure to follow in bidding on government business requiring specification finishes. Our experience in two World Wars and in the present emergency leads us to believe that you, the

TABLE I

Iron and Steel Conversion Coatings

Specification Number	Specification Title	Mechanical	Hot Alkali	Solvent	Emulsion	Alcoholic Phosphoric Acid	Hot Phosphoric Acid	Medium Phosphate	Heavy Phosphate	Pickling	Chemical Treatment	Black Oxide
JAN-C-490	Cleaning and Preparation of Ferrous Metal Surfaces for Organic Protective Coatings	Grade II Type I	Grade II Type II	Grade II Type III	Grade II Type VI	Grade II Type IV	Grade II Type V	Grade I	...	....	....	....
57-0-2	Finishes Protective for Iron and Steel	....	....	....	....	....	....	Type II Class C	Type II Class A & B	....	....	Type III ....
JAN-F-495	Finshes for Equipment Hardware	....	....	....	....	Type I II	....	....	....	....	....	....
JAN-T-704	Treatment and Painting	....	....	JAN-C-490 Grade II Type III	....	JAN-C-490 Grade II Type IV	....	JAN-C-490 Grade I	....	....		570-2 Type III
72-53	Finishes for Ground Signal Equipment	....	....	....	....	...	....	....	....	....	....	....
T-1184D	General Specifications for Finishing, Treating and Painting	....	....	....	....	....	....	Class A Type I	....	....	Type I Class A	....
MILC-10578	Compound, Metal Conditioner Rust Remover, (Phosphoric Acid Type)	....	....	....	....	Type I & II	....	....	....	....	....	....
51-70-1	Painting and Finishing of Fire Control Instruments; General Specification for	....	JAN-C-490	....	....	....	....	57-0-2 Type II Class C	....	....	....	....
3-192	Finishes, Treating and Painting for Engineer Equipment	Superseded by JAN-T-704										
29-103	Finishes for Equipment Hardware	Superseded by JAN-F-495										
3-213		Superseded by MIL-C-10578										

whether your product must be finished for corrosion resistance, or paint adherence, or with eye-appealing brightness, or in a variety of attractive colors, there's an **IRIDITE** to do the job!

Zinc, cadmium, aluminum, copper, brass or bronze, in their usual commercial forms, can be finished with Iridite for a fraction of a cent per square foot . . . and without costly special equipment or personnel training. In addition, our ARP plating chemicals . . . brighteners, addition agents, etc. . . . can increase the efficiency of your plating solutions prior to Iridite treatment.

Let the experience of our field engineers and laboratory specialists be your guide to the solution of your specific finishing problem. We'll welcome the opportunity to work with you in the development of new materials as new finishing problems arise. ***Write for information, or send samples of your products for free test processing.***

Iridite is approved under government specifications.

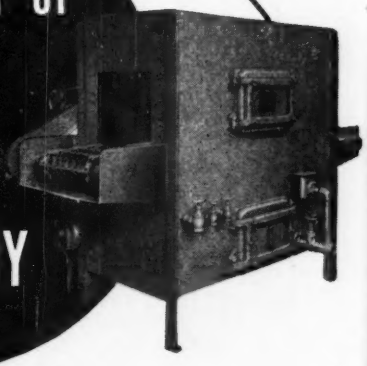
ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.

TABLE II

Non-Ferrous Metals Conversion Coatings

Specification Number	Specification Title	Aluminum	Magnesium	Brass and Bronze	Zinc Coatings	Cadmium Coatings
JAN-F-495	Finishes for Equipment and Hardware	.....	.....	Type III	.....	.....
57-0-2	Finishes Protection for Iron and Steel	.....	.....	.....	Type I	Type I
JAN-T-704	Treatment and Painting	98-20007 ANQQA696	AN-M12 Type I	.....	.....	.....
72-53	Finishes (for Ground Signal Equipment)	ANQQA696	.....	.....	.....	.....
T-1184D	General Specification for Finishing, Treating and Painting	ANQQA696	.....	.....	.....	.....
R.R.-C-82	Cans Corrugated: Ash and Garbage, Taber Side, Zinc Coated with Covers	.....	.....	.....	.....	.....
Nav. Ord. OS-675	Specification for the Manufacture and Inspection of Cartridge Power and Rocket Tanks (Aluminum)	JAN-P-116 MILC-5543	.....	.....	46-P-2 OS-1374	.....
51-70-1	Painting and Finishing of Fire Control Instruments: General Specifications for	FXS963	.....	.....	.....	.....
29-103	Finishes for Equipment Hardware	Superseded by JAN-F-495				
3-192	Finishes, Treating, and Painting for Engineer Equipment	Superseded by JAN-T-704				

what manufacturer of WASHING MACHINES for INDUSTRY



is backed by 50 years of engineering experience?

the answer is...

ALVEY-FERGUSON

1901 to 1951

write for complete information

50 ANNIVERSARY THE ALVEY-FERGUSON CO. CINCINNATI, OHIO

THE ALVEY-FERGUSON CO.
631 Disney St. Cincinnati 9, Ohio

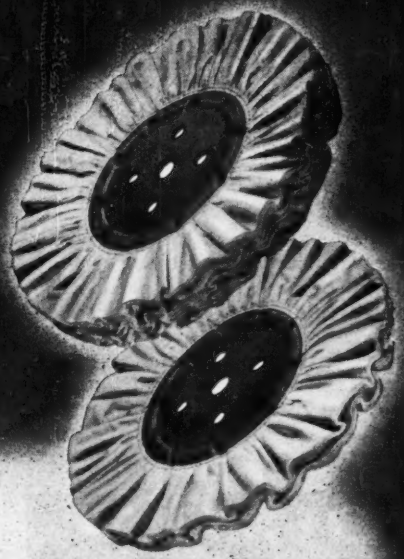
Manufacturers of A-F Conveying Equipment and Washing Machines for Industry

TABLE III

Division	Item	Specification	Description or Title
Ordnance Corps	Ammunition	JAN-C-490	Cleaning and Preparation of Ferrous Metal Surfaces
		JAN-P-72	Lacquer Resisting Synthetic Primer
		JAN-L-73	Lustreless Lacquer Enamel
		MIL-E-10687	Lustreless Quick Drying Enamel for Ammunition
		JAN-P-450	Acid Proof Block
		3-221	Phenolic Baking Varnish (Cartridge Cases)
	Containers	TT-E-485-B (or in some cases 52-E-13)	Exterior Rust Inhibiting Olive Drab Enamel
	Automotive	TT-P-659	Synthetic Primer Surfacer (Tints and White)
		TT-E-489	Gloss Synthetic Enamel
		TT-P-636	Synthetic Paint Primer
		3-174—Grade I, Class B	Synthetic Semi-Gloss Enamel
		AXS-1678	Lustress Non-Skid Enamel
Quartermaster	Blitz and Water Cans	TT-E-485-B	Exterior Rust Inhibiting Olive Drab
	Helmets and Liners	MIL-P-688-A	Zinc Chromate Primer
		3-173—Grade I	Synthetic Lustreless Enamel
	Beds and Cots	TT-P-636	Synthetic Paint Primer
		TT-P-659	Synthetic Primer Surfacer (Tints and White)
		TT-E-491	Synthetic Gloss Enamel
		3-173—Grade I	Synthetic Lustreless Enamel
		3-174—Grade I	Synthetic Semi-Gloss Enamel
	Shelters	TT-P-636	Synthetic Paint Primer
		TT-E-485-B	Exterior Rust Inhibiting Olive Drab
Engineer Corps	Bailey Bridges (and parts thereof)	TT-P-636	Synthetic Paint Primer
		TT-P-636	Synthetic Paint Primer—modified for application on wood
		3-173—Grade I	Synthetic Lustreless Enamel
		3-174—Grade II	Synthetic Semi-Gloss Enamel
	Camouflage	JAN-C-765	Fire Retardent Camouflage Coating
	Roads	T-1290	Reflectorized Coating System
	Equipment and Communications	JAN-C-173—Grades I and II	Coating Materials, Moisture and Fungus Resistant
	Landing Mats	JAN-C-490	Cleaning and Preparation of Ferrous Metal Surfaces
		TT-E-485-B	Exterior Rust Inhibiting Olive Drab Enamel
Navy Ordnance	Ammunition	JAN-C-490	Cleaning and Preparation of Ferrous Metal Surfaces
		MIL-P-6889-A	Zinc Chromate Primer
		52-E-13	Rapid Drying Semi Gloss Enamel
	Landing Craft	JAN-P-735	Alkyd Type Zinc Chromate Primer
		3-173—Grade I	Synthetic Lustreless Enamel
		MIL-D-15170	Abrasive Deck Coating
		MIL-V-1174	Water Resisting Spar Varnish
Air Forces	Aircraft (General)	AN-P-656	Zinc Chromate Primer
		AN-L-29	Nitrate Cellulose Lacquer
		AN-E-3	Aircraft Gloss Enamel
		52-L-26 (AER)	Cellulose Nitrate Lacquer

Unsurpassed!

Ventilated
NON-FRAY
BUFFS



by

CODMAN

For Over 55 Years the Greatest Name in Buffs

F.L.&J.C. CODMAN COMPANY

ROCKLAND · MASSACHUSETTS

THE CODMAN NON-FRAY VENTILATED BUFFS ARE MADE UNDER PATENT NUMBERS 2,027,863, 2,094,650, 1,573,951 RE. 19,894, 2,140,208. OTHER PATENTS PENDING

BRANCH OFFICES: PHILADELPHIA · DETROIT · LOS ANGELES · INDIANAPOLIS · GRAND RAPIDS

paint users, can obtain the information you require in the simplest, most expedient fashion by contacting your finishing material supplier. We, for instance, have a special organization set up primarily for the purpose of being able to supply our customers and prospects with up-to-date information on the latest revisions and amendments of the paint specifications used on various defense items. This service requires the use of an elaborate bookkeeping system and the reviewing of many bulletins, news announcements, and other sources of information.

You might also rightfully ask why it is such a complicated job to develop a material to meet a given specification. If you would review a number of recently issued specifications and a corresponding number of similar specifications issued five or ten years ago, you would find a very noticeable increase in detailed requirements and a great increase in the number of tests required of the manufacturer to establish that the quality of his product is that desired by the specifying agents. In many of these specifications, the manufacturer is told not only the composition of the product he is to produce, but is also given a large number of physical and/or chemical resistance test requirements of the dried or baked film on metal.

(Adapted for PRODUCTS FINISHING from a paper presented at the Annual Educational Session of the Milwaukee Branch, American Electroplaters' Society.)

FOR SILVERSMITHS, PLATERS, JEWELRY MFGRS., ETC.

Supplied in brass, steel or nickel silver wire in sizes .0025 - .006 or bristle, Nylon or fibre. Special sizes and shapes to order.

Write us (dep't. P) for catalog and price list, on your letterhead

DIXON & RIPPEL, INC. KINGSTON, N. Y.
ESTABLISHED 1856

LITERATURE CITED

Preparation of Metals for Organic Finishes, Alfred Douty, "Organic Finishing," September 1950.

Pre-Treatment of Aluminum Sheet for Painting, G. W. Birdsall, "Metal Progress," December 1949.

Amorphous Phosphate Coatings for Protection of Aluminum Alloys and for Paint Adhesion, Alfred Douty and F. P. Spruance, Jr., "36th Annual Proceedings of American Electroplaters' Society," (1949).

What Are Cleaning Materials and How Do They Work?, Samuel J. Miller, "American Dietetic Association," January 1951, vol. 27, no. 1.

Methods of Investigation of Surface Treatment for Corrosion Protection of Steel, R. E. Pollard and W. C. Porter, "Bureau of Standards Report BMS," October 11, 1938.

Surface Treatment of Steel Prior to Painting, R. E. Pollard and W. C. Porter, "Bureau of Standards Report BMS-44," April 18, 1950.

Painting Steel, W. C. Porter, "Bureau of Standards Report BMS-102," October 16, 1944.

Effect of Surface Preparation on the Durability of Organic Coatings, Van M. Darsey, American Electroplaters' Society, Pittsburgh, June 17, 1946.

Phosphate Coating of Aluminum, R. C. Gibson and R. S. Russell, "Industrial & Engineering Chemistry," December 1946, vol. 38, p. 1222.

ACTUAL UNRETOUCHED PHOTOGRAPH

A CASE HISTORY FROM THE STEVENS EXPERIMENTAL POLISHING AND BUFFING LABORATORY

Here is a step-by-step example of how Stevens' customer-service works in actual operation. The customer in this case was a plumbing fixture manufacturer who asked the Stevens experimental polishing and buffing laboratory to develop the most efficient methods and recommend the correct compositions for giving a high luster to chrome-plated brass bath fittings. These were the findings:

POLISHING: The brass rough casting **1** was put through three polishing operations —ROUGHING with No. 80 Artificial Abrasive on a 16-inch wheel at 1900 r.p.m., dry; FINING with No. 120 Artificial Abrasive on a slightly softer wheel, also dry, and OILING with No. 180 Natural Emery on a ¾" spiral sewed 14-inch canvas polishing wheel (medium hard) at 1900 r.p.m., lubricated with Stevens No. 2 Tallow Stick.

BUFFING: The polished casting **2** was then buffed with Stevens No. 47 Tripoli on a Stevens radial sewed, 16-pocket, 86/93 count buff 14 inches in diameter at 2100 r.p.m. The casting **3** was then ready for electroplating.

COLORING: Following the electroplating process the casting was buffed with Stevens No. 101 Chrome Composition on a Stevens 64/64 folded buff, 14 inches in diameter at 2100 r.p.m. The resultant beauty and high luster is apparent in **4**

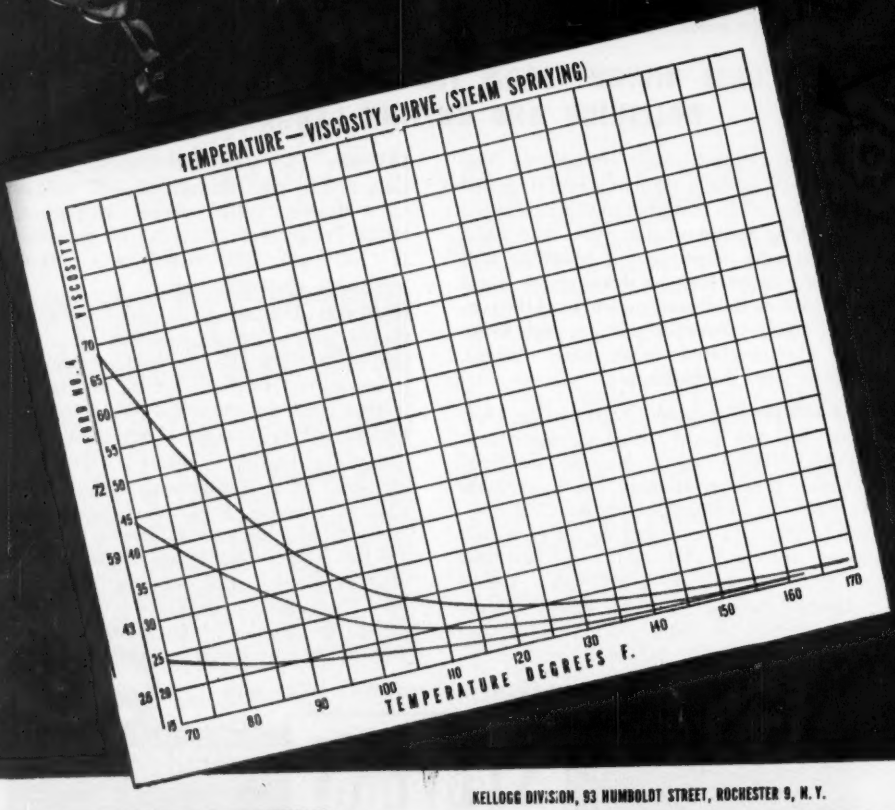
This is a typical case where Stevens' technical and research facilities were able to bring to a customer the exact, tailored polishing and buffing techniques for his specific operations. We will be glad to do the same for you. Just call your Stevens representative or write direct to *Frederic B. Stevens, Inc., Detroit 16, Michigan.*

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. **STEVENS** INCORPORATED

DETROIT 16, MICHIGAN

Save 10%-20%



KELLOGG DIVISION, 93 HUMBOLDT STREET, ROCHESTER 9, N. Y.

Brake Shoe

# of finishing materials with STEAM spraying

Operating figures demonstrate that the new steam spraying process probably can save you time and money in your finishing operation. Our production line systems installed to date indicate that you can save up to 10-20% of expensive basic material, and even higher percentages of solvents and thinners, these 2 ways:

1. By heating material at the point of atomization. The temperature-viscosity chart opposite shows what happens to the viscosity of finishing materials as temperature rises. Despite initial viscosities ranging from 35 to 70 at 70°F., due to varying percentages of solvent, all three samples thin down to about 17 at 160°F. Thus by heating it is possible to spray materials with but a fraction of the normal amount of thinner. Finishing materials quickly revert to their original viscosity upon striking the surface, permitting the application of thicker coats in one pass of the gun without sags or runs.

2. By reducing overspray and atomization losses. Materials sprayed with compressed air tend to "bounce off" sprayed surfaces. The air is constantly clouded with paint mist—valuable material lost. But with steam spraying, superheated steam dissipates on leaving the gun, appreciably reducing "bounce-off" and overspray loss.

In addition, you can increase operator productivity with steam spraying's thicker coats, speeding your operation and cutting labor costs. Coats are equal to, or better in quality than, conventional finishes, and are surprisingly free from sags, popping and runs.

The heart of the process is the Kellogg-American Steam-Spray gun. Cool to the touch (exclusive insulation, heat radiating design and built-in finger guard assure this) and finely balanced (hose support reduces downward torque on the head), this gun makes the process practical for production-line use.

We can supply you with all the equipment necessary for steam-spraying. We will be glad to demonstrate the process in your own plant, or arrange visits to convenient installations. Mail the coupon today.

DOMINION BRAKE SHOE COMPANY, CANADIAN PLANT, NIAGARA FALLS, ONT.

American Brake Shoe Company, Kellogg Division
93 Humboldt Street, Rochester 9, N. Y.

Gentlemen:

Please send me information on steam spraying.

NAME.....**TITLE**.....

FIRM.....

ADDRESS.....

CITY.....**ZONE**.....**STATE**.....

Fig. 1—The plated specimen is first cleaned and then dipped in the rack coating lacquer.

Fig. 2—Plastic washers are placed on the still fluid surface of the stop-off lacquer, thus defining the area on which nodules are to be deposited.

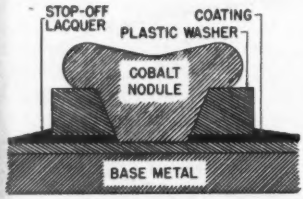


Fig. 3—Nodules are built up by plating the uncovered areas in a solution of cobalt chloride at both high and low current densities.

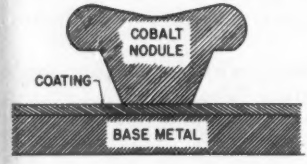


Fig. 4—Prior to the testing of adherence strength, the plastic washers and stop-off material are removed by peeling or by use of a solvent.

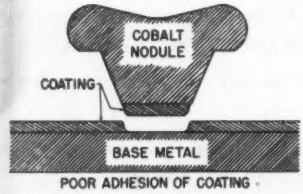


Fig. 5—The force required to detach the plated coating by means of the cobalt nodule is measured on a spring balance. This illustration shows an example of poor adhesion of the coating to the base metal.

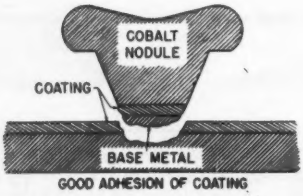


Fig. 6—When adhesion is good, some of the base metal may be removed with the coating when the force is applied.

Cobalt Nodule Method Measures Adhesion of Electrodeposits

(NBS Technical Report No. 1541)

A SIMPLE, inexpensive method for determining the adhesion of commercial electrodeposited coatings has been recently developed by Abner Brenner and Virginia Morgan of the National Bureau of Standards. The new technique[1] involves the electrodeposition of an adherent, mushroom-shaped nodule on the surface of the coating to act as a grip for the application of a detaching force. The force required to pull off the nodule—together with a portion of the coating—is then obtained on a spring balance in ordinary mechanical units.

The adhesion of an electrodeposit to the basis metal is an important factor in the serviceability of the coating. While very adherent coatings cannot be removed by any ordinary mechanical means, those with a lower degree of adhesion may either peel spontaneously or become detached if the plated object is flexed or abraded. Less adherent coatings are also more susceptible to corrosion, which spreads readily through scratches and imperfections in the surface.

Although a high degree of adhesion can be readily obtained by proper cleaning and pretreatment of the basis metal, very adherent coatings cannot be conveniently and consistently mass-produced without effective laboratory

to page 44→

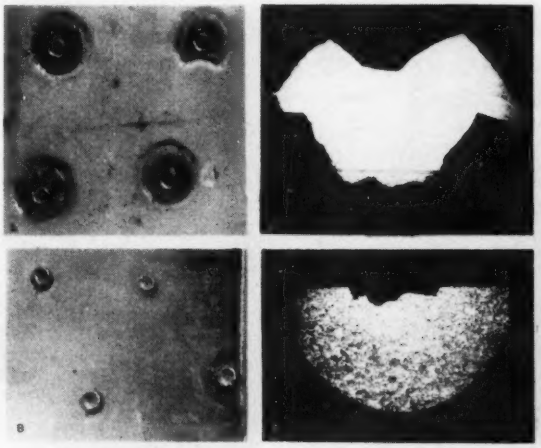
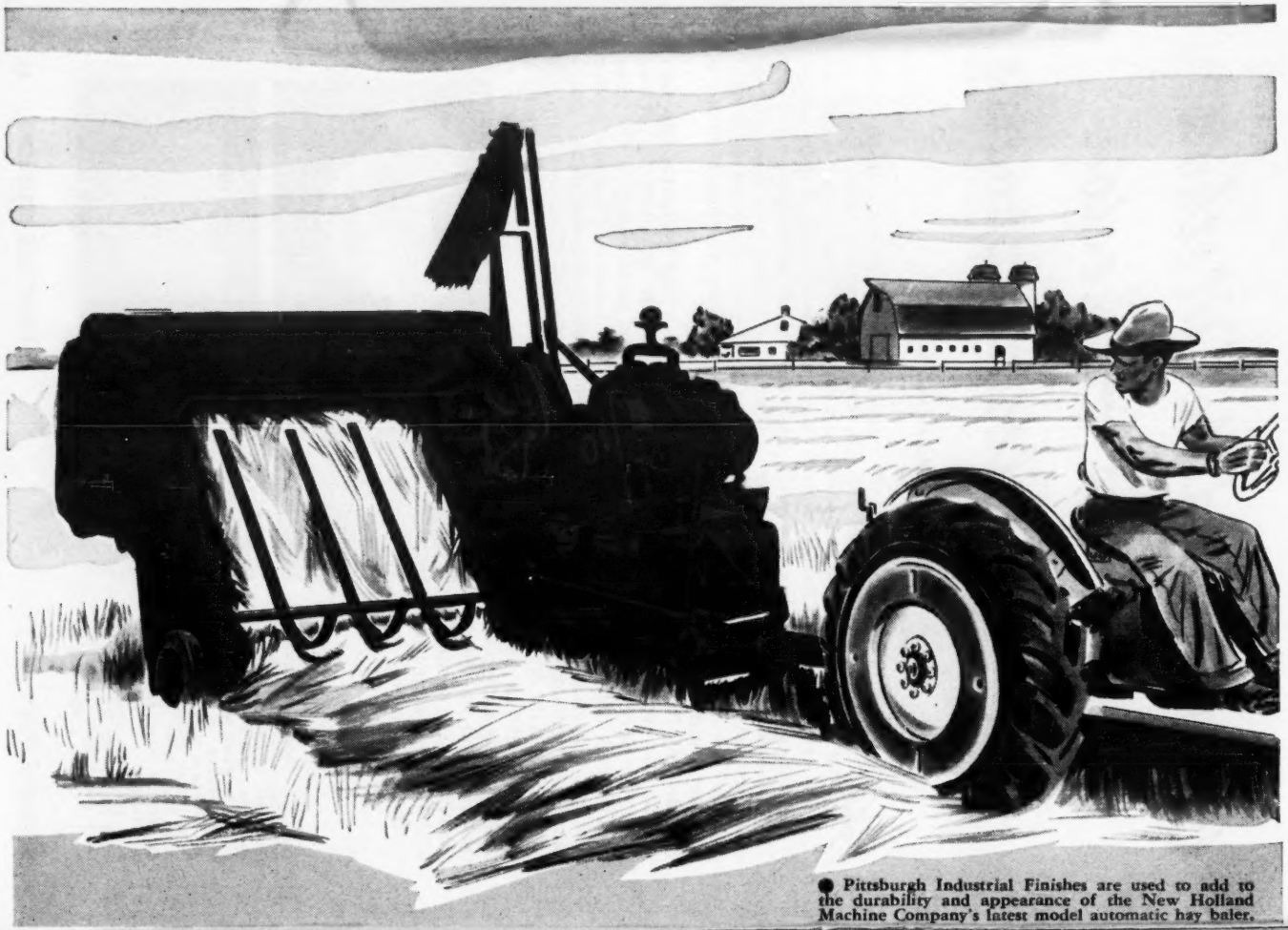


Fig. 7—A: nodules surrounded by plastic washers on the lacquered surface of a plated specimen. B: nodules with plastic washers removed. C: cross-section of a nodule which has been detached from nickel plated copper. Note the nickel coating at the bottom with the copper adhering to it. (*Magnification, x 30*). D: cross-section of a crater left by detachment of a nodule. (*Magnification, x 30*).



● Pittsburgh Industrial Finishes are used to add to the durability and appearance of the New Holland Machine Company's latest model automatic hay baler.

Pittsburgh Industrial Finishes

improve wearability and sales appeal of many fine farm implements

PITTSBURGH is helping to add to the sales appeal and wearability of many types of agricultural implements by providing high quality enamels and varnishes for these products.

● **Years ago** farm tools were painted mostly by hand with Japan colors or flat coats, followed by clear coats of varnish. This was a slow, costly process.

● **Increased production** has brought about the practice of dipping and, later, flow-coating. Some products are now sprayed.

● **Working** with leading producers of farm implements, Pittsburgh pioneered the transition from the flow coat to the enamel type by introducing bright color varnishes. Eventually, this led to a two-coat enamel system by which implements and parts could be finished in a single day.

● **With the later** perfection of alkyd synthetic enamels which can be dipped, flow-coated or sprayed, air-dried or force-dried, greater color retention as well as better protection have been achieved. All of this has been brought about by the kind of close cooperation between Pittsburgh and Farm Machinery Manufacturers which has been characteristic of Pittsburgh service in many fields.

● **Our experience** in supplying thousands of formulations for industrial needs can be helpful—often save time and money. Call on us for facts and figures.

PITTSBURGH PLATE GLASS COMPANY
Industrial Paint Division, Pittsburgh, Pa.

Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PPG

PITTSBURGH *Industrial* **FINISHES**

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

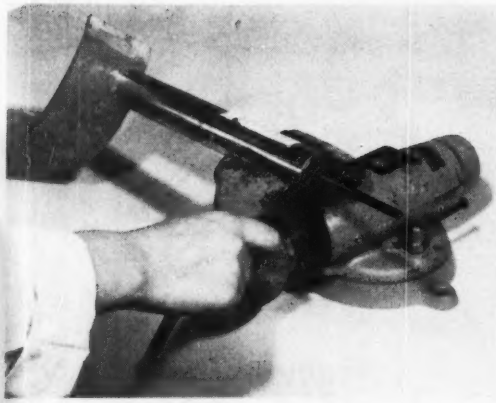


Fig. 8—The nodules are gripped in a chuck which is attached to a spring. The force exerted on the nodule can then be easily read on the scale of the spring balance. (*All photographs courtesy of National Bureau of Standards, Washington 25, D. C.*)

control. Several methods have therefore been suggested for measurement of the adhesion of electrodeposited coatings in commercial production. None of these, however, have been generally applicable. Some, for example, require specially prepared specimens and careful machining. Others involve the application of heat, which may alter the adhesion of the coating. A further disadvantage of some methods is that they do not express the results of the measurement in simple units having any easily visualized significance.

The technique developed by NBS overcomes most of the difficulties associated with the other methods. Perhaps the greatest problem has been that of gripping a thin coating in such a way as to apply a pull sufficient to detach it from the basis metal. This problem was solved by the formation of the mushroom-shaped projection on the coating under study. First, all of the plated surface is covered with a lacquer of "stop-off". Then several small areas, about $\frac{1}{16}$-inch in diameter are defined by plastic washers having tapered holes. The lacquer is removed from these small areas and the nodules are built up by plating the uncovered areas in a cobalt solution. After removal of the plastic washers and stop-off material, the nodules are gripped in a chuck attached to a spring balance and detached by exerting force through the spring. The nodule always removes the initial coating, occasionally along with some of the basis metal if adhesion is high. From the reading of the spring balance and measurement of the area of the base of the nodule, the adhesive force per unit area is computed.

In practice, the plated specimen is first thoroughly cleaned and then dipped in the rack-coating lacquer. After this coating has been partially dried in an oven, the specimen is again dipped in the lacquer, and plastic washers $\frac{1}{8}$ inch thick and about $\frac{1}{8}$ inch in inner diameter, are placed on the still fluid surface. After the lacquer has been set by heating for one or two hours, the washers are firmly held in place.

Because the holes in the washers are now filled with lacquer, they must be cut out with a steel coring tool. This should be done carefully as otherwise the nodules will not grow out smoothly, and the cross sections of their bases will not be well defined. In addition to the holes within the washers, two areas on the specimen, 0.5 by 2 inches, are freed from lacquer in order to draw more current and thus make the average current density easier to measure.

The electroplated surfaces exposed through the holes in the washers are scrubbed with pumice or similar material, and the specimen is etched for about two minutes in an anodic solution, consisting of either 30 per cent or

The Effect of Impurities in Nickel Solutions

...and Methods of Purification

Bright nickel baths are usually much more sensitive to impurities than are matte nickel solutions, and certain contaminants are much more harmful than others. The effect of these contaminants and some methods of purification in current use are indicated below.

ARSENIC tends to lower the tensile strength of nickel deposits. It also causes dull, streaked, brittle deposits. The Liscomb method successfully removes arsenic.

CALCIUM sulphate in a nickel bath causes roughness, pitting and dullness. Filtration readily removes suspended crystals.

CHROMIUM contamination tends, generally, to reduce cathode efficiency and produce deposits in a marked degree of stress. The contaminant can be removed by the Liscomb method, by precipitation at a high pH, or by formation of insoluble lead chromate.

COPPER has the effect of producing dull, dark deposits in the low current density regions, and general fogging of the deposit in other regions. Most effective removal of traces is achieved by a low current density electrolysis at low pH, high temperature and high rate of agitation.

IRON as colloidal ferric hydroxide causes roughness. In a soluble form it codeposits with nickel. This impurity causes one form of pitting. Low current density electrolysis or high pH treatment removes iron.

LEAD causes dark, streaked deposits, and non-adhesion of nickel. Low current density electrolysis removes lead.

NITRATES in a nickel solution strongly depress current efficiency. High concentrations may stop deposition entirely. Electrolytic reduction at the cathode removes this impurity.

ORGANIC SUBSTANCES of many types, including grease, waxes, dust, etc., are detrimental. Their removal usually involves oxidation or carbon filtration, or both treatments.

SULPHUR, in the form of organic compounds, has a brightening effect in many types of nickel solutions. Nickel sulfide is harmful because it results in evolution of hydrogen sulfide and precipitation of sulfides. Although carbon treatment removes some organic compounds containing sulfur, and a high pH precipitates sulfides, there is no general method for removing traces of sulfur compounds.

ZINC in amounts of 0.007 oz/gal is a brightener in dull-nickel plating baths, but higher concentrations yield brittle deposits which may be dark or streaked. The Liscomb method can reduce zinc concentrations. However, low current density electrolysis is the most widely accepted process.

AES RESEARCH PROGRAM

The American Electroplaters' Society is conducting a comprehensive research program and has developed useful information on current plating problems. International Nickel, in addition to its other support of this program, feels that it will be a further service to make copies of these AES Research Reports available. For an authoritative 36-page bibliography and correlated abstract, we offer you a free copy of the AES Research Report, Serial No. 15, entitled "Effect of Impurities and Purification of Electroplating Solutions." Use the coupon, now.

INCO

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Please send me a copy of AES Research Report, Serial No. 15, entitled: "Effect of Impurities and Purification of Electroplating Solutions."

Name..... Title.....

Company.....

Address.....

City..... State.....

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

70 per cent sulfuric acid, at a current density of 1.5 amp./sq. in. After etching, the specimen is rinsed quickly and plated—first in an acid solution of cobalt chloride at high current density to secure good adhesion, then in a more dilute solution of cobalt chloride at lower current density to build up the nodules. The specimen is plated in the acid solution, which contains 100 grams of cobalt chloride dissolved in a liter of dilute hydrochloric acid (10 per cent by volume), for three minutes at a current density of 0.5 amp./sq. in. It is then transferred, without rinsing, to the regular cobalt plating solution, a molar solution of cobalt chloride kept at a temperature of 167 deg. F. and pH between 4 and 5. A current density between 0.13 and 0.65 amp./sq. in. is used to form the nodules. Nodules have been built up in as little as three to six hours by using high current densities, but the strongest and most regularly shaped nodules are obtained by plating overnight at a current density of 0.13 amp./sq. inch.

Before measuring the adhesion of the nodule, the plastic washers and stop-off material are removed from the surface. Sometimes the lacquer may be peeled from the specimen, particularly when the coating has been baked at a low temperature. If not, the washers and stop-off may be dissolved or softened in a suitable solvent. The nodule is then gripped in the jaws of the chuck, and the force indicated by the spring balance when the nodule is detached is read.

In order that the results of the test may be expressed in pounds per square inch the area from which the nodule was detached must be determined because this area may differ somewhat from the nominal area of the hole in the plastic washer. A gage made of transparent material and containing a

KEEP BOOTHS FIRE-SAFE THIS LABOR-SAVING WAY WITH

LIQUID ENVELOPE

PEELABLE SPRAY-BOOTH COATING

Using expensive labor to scrape down spray-booths costs a lot more than peeling off accumulated overspray in big sheets. Safer, too. Order a 5-gallon Test-Sample at Drum Lot price.

BETTER FINISHES & COATINGS, INC.

268 Doremus Avenue, Newark 5, N. J.

122 East 7th St., Los Angeles 14, Calif.

DISTRIBUTED BY

General Spray Equipment Co., Boston, Mass.

Bay State Spray Equipment Co., Springfield, Mass.

Lea Manufacturing Co., Waterbury, Conn.

Edgcomb Steel of New England, Milford, Conn.

Kellerman Paint Co., New York, N. Y.

Grapek Paint Co., Newark, N. J.

M. Buten & Sons, Inc., Philadelphia, Pa.

R. W. Renton Co., Cleveland, Ohio, Indianapolis, Ind.

Dean & Barry Co., Columbus, Ohio

Vic Miner Co., Toledo, Ohio

Abrasive & Supply Co., Detroit, Mich.

Melson Industrial Supply Corp., Grand Rapids, Mich.

O'Donohue Sales Co., Milwaukee, Wis.

Paints & Lacquers, Inc., Chicago, Ill.

Tanner & Co., Indianapolis, Ind.

Metal Goods Corp., St. Louis, Mo., North Kansas City, Mo., Dallas, Texas, New Orleans, La.

Hubbard & Stau, Los Angeles, Calif.

M. E. Smith Co., Los Angeles, Calif.

C & H Supply Co., Seattle, Wash.

Hugh Russel & Sons Ltd., Montreal & Toronto, Canada

SMOOTHER POLISHING
means Easier going

Photographs courtesy Allis-Chalmers Mfg. Co.

EXOLON ABRASIVES

For Fast Polishing in All Types of Metal Finishing

● For smooth surfaces of moldboard plows and for any tool or equipment where smoothness means more effective work, EXOLON Aluminum Oxide Abrasives assure fast, uniform metal finishing. These chunky, durable grains are magnetically separated, carefully graded and shaped for polishing all types of tough metals, including spring steel, sheet metal, cold rolled stock, forgings and stainless steel. Ceramically coated for strong adhesion to the set-up wheel, EXOLON RST is the ultimate choice for efficient polishing.

Write for complete information on EXOLON Abrasives NOW

The EXOLON Company

943 EAST NIAGARA STREET TONAWANDA, NEW YORK

Manufacturers of Silicon Carbide and Aluminum Oxide Abrasives

series of circles of varying diameter has been found to estimate the area with sufficient accuracy.

The adhesion which can be measured by the NBS method is limited only by the strength of the cobalt nodule. As electrodeposited cobalt has a tensile strength of about 75,000 lb. per sq. in., the test should be satisfactory for measuring the adhesion of most commercially plated coatings. So far it has not been possible to measure the adhesion of bright nickel coatings because the cobalt nodule does not adhere tenaciously enough to the bright nickel. However, NBS is now making efforts to devise a procedure for obtaining the necessary degree of adhesion. Another possible disadvantage is the time which a skilled technician must spend in making the test. Ordinarily, if the nodules are deposited overnight, one skilled operator can prepare and test about 10 specimens each day.

[1]For further details, see The nodule method of measuring the adhesion of electrodeposited coatings, by Abner Brenner and Virginia Dare Morgan, Proc. Am. Electroplaters' Soc. 37, 51 (1950).

It is well known that the human eye is sensitive to only one particular region of the electromagnetic spectrum. Why doesn't it see infra-red or ultra-violet? In answering this question the Color Research Laboratory of Sun Chemical Corporation states that one plausible explanation is that the eyes of animals, fish and birds had their origin in water. According to this theory the visible spectrum is roughly the transmission of water. The rods of the eye—tiny nerve structures—respond only to white and black, while the cones respond also to color. What they see corresponds to the light energy that best travels through air and water.

Again, there is a curious independence between color as sensation and color as radiant energy. It is human, for example, to see colors as filmy and spatial—like the sky; as three-dimensional—like smoke or a bottle of liquid; as opaque and structural—like a painted surface. Further independence of vision has been noted in the fact that while colors may be fashioned in many ways, the (human) eye often tends to give them likeness.

All colors are not of a so-called chemical nature (paint, dye). The rainbow, the luster of an opal, a drop of oil on water, iridescence in a peacock feather—these are phenomena of light caused by refraction, diffraction, interference, polarization, and so on, and are more related to physics than to chemistry.

No pigments in such cases may be involved. The legerdemain is such that light is scattered, split apart, or otherwise broken up into different hue elements.

Frequent replacement of malt and grain conveying tubing at grain processing firms has been markedly reduced by lining the tubing with industrial grade porcelain enamel, state engineers at The Erie Enameling Company.

Friction occurring at bends in the pneumatic tubing originally set up abrasion which wore through ordinary steel tubing. A solution was discovered when Erie Enameling applied a porcelain enamel lining with a low coefficient of friction plus a specially formulated hardness.

Pneumatic conveyor firms predict further use of porcelain enamel lining at heavy-wear points in systems handling dry plastic materials including the conveyor ducts, cyclone receivers, and storage bins.

The greatest of faults is to be conscious of none.—*Thomas Carlyle.*

To meet MILITARY SPECIFICATIONS

for Cleaning • Rust-Removing • Etching Phosphatizing and General Metal Conditioning of all kinds of Metal Surfaces

Use PREP PRODUCTS!

SPECIFICATION NUMBER	CONFORMING MATERIAL
MIL-C-5541 (see also QPL-5541-1)	Lyfanite
MIL-S-5002	Lyfanite
MIL-C-10578	
Type 1	Metalprep Nos. 77, 102—Alumiprep No. 1
Type 2	Metalprep Nos. 10, 15—Alumiprep No. 20
JAN-C-490—Grade II	
Type 2	Emulsoprep
Type 4	Metalprep, Prep-Pik-L, Alumiprep, Prep-Rite
Type 5	Metalprep, Alumiprep, Prep-Pik-L, Prepwash
Type 6	Emulsoprep No. 710-E.C.
U.S.A. 3-213	(See MIL-C-10578)
U.S.A. 3-192	Metalprep Nos. 28, 10, 15 Alumiprep No. 20
U.S.A. 98-20007	Metalprep Nos. 10, 15 Alumiprep No. 20 Prep-Rite No. 16
U.S.A. 72-53	(See AN-F-20)
AN-F-20	Lyfanite
	Metalprep Nos. 10, 15, 77, 102 / Alumiprep Nos. 1 and 20 — See MIL-C-10578
AN-E-19	Lyfanite
AN-C-170	(See MIL-C-5541)
TAC-ES-431	(See MIL-C-10578)
AXS-1245	(See JAN-C-490, Grade II)
Engineering Corps—T-1184	Metalprep No. 28
U.S.N.—Appendix 6.	Metalprep

51-C

Send for Data Sheet • Advise Govt. Spec. Number

NEILSON CHEMICAL CO.

2682 Tecumseh Rd., Windsor, Ont.

6561 BENSON ST., DETROIT 7, MICH.

3411 Union Pacific Ave. Los Angeles 23, Calif.

Fig. 1—(Above, left) Convention Chairman Bert Kirchhoff calls opening session to order. Rev. Frank C. Mesle (at left) gave the Invocation. (Above, right) Supreme President Wm. J. Neill presents Dr. D. Gardner Foulke, new assistant to the executive secretary. (Below, left) Dr. William Blum addresses the assembly.

Views and News of the A.E.S. Buffalo Convention

Reported by FRANK L. BONEM

Fig. 2—Annual Luncheon and Meeting of the International Fellowship Club.

Fig. 3—(Above) Keynote speaker and participants in the First Educational Session meet for lunch. Left to right: Dr. C. J. Wernlund, Educational Chairman; Ezra A. Blount, Editor, PRODUCTS FINISHING; C. Civan, George L. Nankervis Co.; George W. Jernstedt, Session Chairman; Donald H. Schantz, Michigan Bumper Corp.; Mrs. Florence Marquardt, stenotype reporter; R. J. Rominski, General Motors Research Corp.; Mrs. Wm. Blum; Dr. Wm. Blum, National Bureau of Standards; W. E. Stadel, George L. Nankervis Company.

Fig. 4—(Center) Dr. R. B. Saltonstall, chairman of Second Educational Session, opens the discussion period. Speakers, left to right: C. F. Nixon, Ternstedt Div., G.M.C., who presented Mr. Beckwith's paper; Mr. R. Caldwell, Doehler-Jarvis Corp., Chester G. Borlet, United Chromium, Inc.; Earl W. Arnold, L. H. Butcher Co.; and Dr. Saltonstall.

Fig. 5—The National Association of Metal Finishers, Inc. held a successful dinner meeting. John Hilfinger is the new president of the group.

Fig. 6—(Above) A view of the "Chow Line" at the picnic. The white caps were provided by J. J. Siefen Company.

Fig. 7—(Center) Dr. R. B. Saltonstall, Udylite Corp., presented a short technical program for the ladies, and then acted as host at the luncheon which followed his talk.

Fig. 8—Delegates assembled for the Annual Business Meeting. Elder Statesmen Horace Smith and George B. Hogaboom can be seen in front row; John Sterling, right foreground—back to camera.

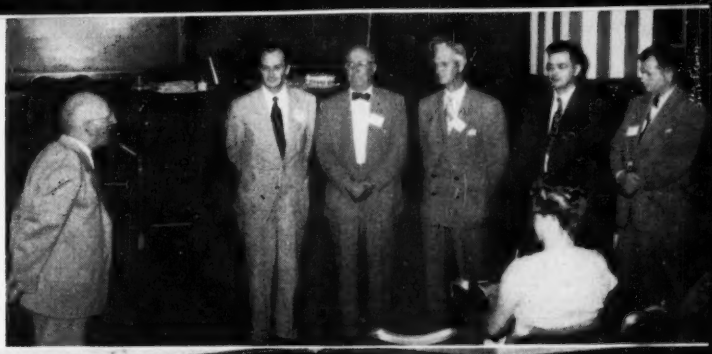


Fig. 9—(Right) George B. Hogaboom installs new A.E.S. officers. Left to right: Mr. Hogaboom; C. F. Nixon, president; F. J. MacStoker, 1st vice president; Dr. George P. Swift, 2nd vice president; Dr. Ralph A. Schaefer, 3rd vice president; Wm. J. Neill, past president.

Fig. 10—(Above) Convention chairman Bert Kirchhoff officiates at Annual Banquet.

Fig. 11—(Left) a group from Chicago. Left to right around the table: Emil Vansteen; Clyde C. Kelly, general chairman of 1952 Convention; A. G. Bartruann; James Hedges; Klenn Petrosius; J. W. Fox, Joseph Skurka; C. E. Proudfoot; Paul H. Krouse.

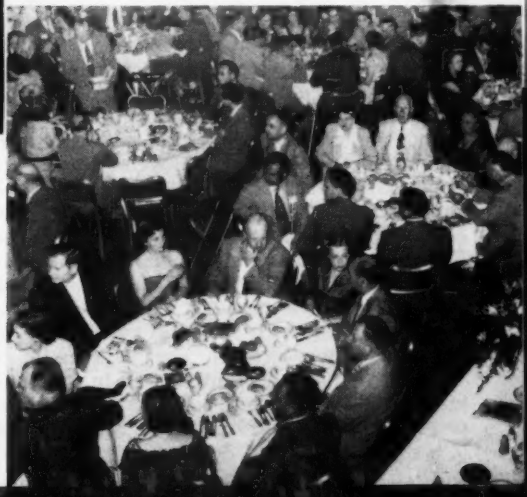


Fig. 12—(Right) Another photo taken at the annual Banquet.
(All photos by PRODUCTS FINISHING)

Spotlighting FINISHING Progress

Selection of Organic Coatings for Metal Products

THE average manufacturer is coming more and more to realize the far reaching advantages of properly selected product finishes. Finishes are used on metal products for protection against corrosion, and to give the product appearance for sales appeal and customer satisfaction. While the selection of a finish is dependent on the use of the end product, no matter what the product is, it should be a balanced finish in which an outstanding property is not gained at the sacrifice of other necessary properties.

As in other fields of material development, the past few years has witnessed in the field of organic coatings an evolution in scientific concepts and coordination. A number of branches of science have exerted their influence in relating the composition of organic finishes to their structures. Practical factors influencing selection of the finish to be used and causing variations in its formulation are, in general, cost, conditions of use and service requirements. Knowledge of these is important to the formulator or supplier because in many cases industrial finishes are applied to a specific product, made to fit a definite manufacturing procedure, and based upon a careful consideration of cost.

Some of the important factors in the formulation of industrial finishes for metal products were discussed by M. A. Glaser, Midland Indus-

Backstand Method Saves Time!

Milwaukee Electric Tool Corp. eliminates a complete operation . . . increases production 40%

Problem: The Milwaukee Electric Tool Corp. had a time-consuming method for sanding cast aluminum motor housings for portable electric tools. After polishing with a hard wheel, they sanded with a #46 set-up wheel, and finished with a grit #100 set-up wheel. This was too long and too costly an operation.

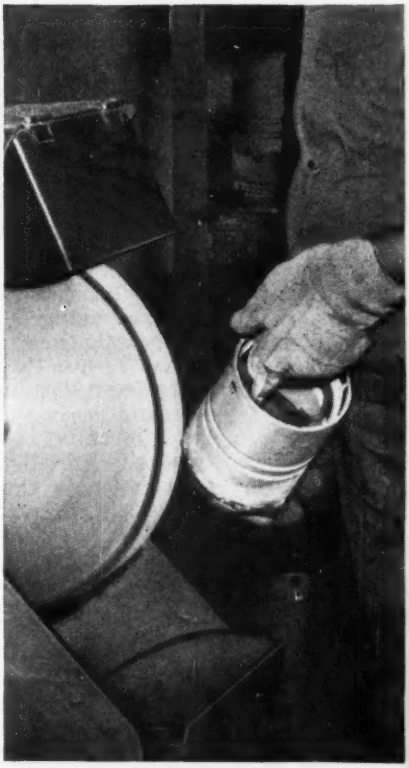
Solution: The Milwaukee Electric Tool Corp. switched from the hard wheel and set-up wheels to the backstand belt for this polishing job.

Result: Now one Armour Backstand Belt does the work of the hard wheel and the #46 set-up wheel. A better finish is obtained and production is up 40%!

Manufacturers of hundreds of different industrial and consumer items have proved the backstand belt method is more efficient and economical than the set-up wheel.

If you are grinding, polishing or finishing flat or contoured surfaces, cast, stamped or forged pieces, the backstand method can help solve your production problems.

Learn more about the backstand belt method. Send now for our free booklet.



Mail this coupon today!

Please send me the booklet "Facts About Backstand Belt Grinding and Polishing."

Name .....

Title .....

Firm .....

Address .....

City ..... Zone ..... State .....

We recommend buying through your Industrial Distributor

ARMOUR

Coated Abrasives Division

SHEETS • ROLLS • BELTS • DISCS

Armour and Company
North Benton Road • Alliance, Ohio

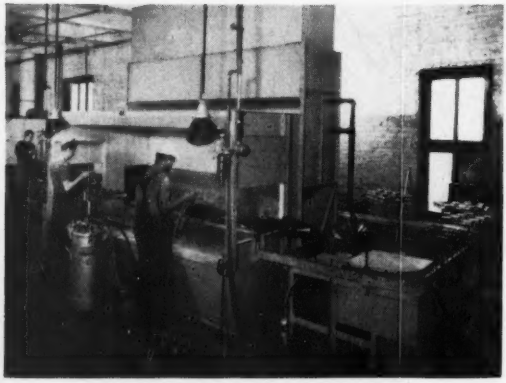


Fig. 1.—A modern water spray booth and conveyor system for finishing small metal parts at Industrial Finishing Company, Chicago. (*Photo courtesy The DeVilbiss Co., Toledo 1, Ohio*)

trial Finishes Company, in a lecture presented at the Illinois Institute of Technology in conjunction with the paint technology class sponsored jointly by the Chicago Paint and Varnish Production Club and Chicago Paint, Varnish and Lacquer Association. According to Glaser, the formulation of an organic finish for a conventional application requires careful consideration of: raw materials, their chemical and physical properties, costs; the interaction of the raw materials used, one upon the other; the probable end results with reference to the desired properties of the finished film.

Factors Influencing Formulation

Classification of metal finishes on the basis of the function of the coating was proposed by Mr. Glaser as one of the most useful methods for examining the utility of various types of coatings. Other useful methods for classification may be based on such factors as appearance, vehicle composition, method by which the coating is applied, and drying mechanism. Figure 1 shows modern equipment used in applying industrial finishes. Requirements of some functional finishes are summarized in Table I.

The vehicle is another important factor in the formulation of metal finishes; the chart in Table II was proposed by Glaser as a guide for the selection of vehicles required for a specific job. In each case the key resin is shown; it is understood that it should be combined with others if and when necessary.

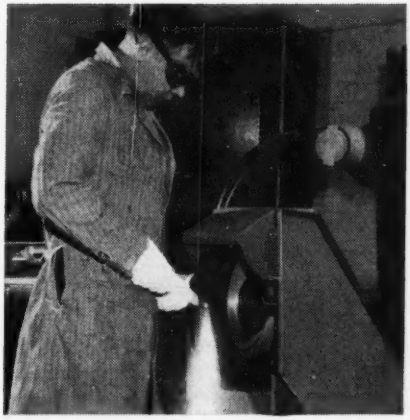
Primer Coatings

Primers are often used under finishes for many types of metal products because it is seldom possible to build into a single coat all of the properties that are desired in a finish. Primers should: perform maximum adhesion of the finish to the surface; provide additional protection against penetration by moisture, and other corrodants which may be in the environment to which the finish is subjected; fill or seal pores or imperfections in the metal surface. Most primers contain corrosion-inhibiting pigments such as zinc chromate, red lead, basic lead chromate, and others which limit the range of possible shades to those which will tolerate considerable quantities of the yellow, red or orange shades of those pigments.

In discussing the formulation of primer coatings, Mr. Glaser presented points to be considered in developing a primer-surfacer to meet the following requirements:

1. Substrate—phosphatized steel.
2. Available drying schedule — 20 min. at 325 deg. F.
3. Application method—spray.
4. Required color—oxide red.
5. Exposure—outdoor.
6. Topcoat—baked gloss synthetic enamel or gloss nitrocellulose lacquer enamel.

YOUR GRINDING COSTS MAY BE TOO HIGH!



GET FAST, EXPERT HELP with your grinding problems at the nearest 3M BRANCH Demonstration Room. Or we'll be glad to have a trained representative call on you and explain the savings you can make by converting your present equipment to the 3M Method.

New booklet shows how the 3M Method reduces grinding and finishing costs up to 85%

You can cut grinding time on every operation, enjoy new production economies by converting your *present* equipment to the 3M Method of Grinding and Finishing.

The new 1951 edition of our popular case-history booklet "Step Up Production" has 36 fact-filled pages of interesting pictures and stories. Use the coupon below for your free copy and read how the 3M Method has helped countless manufacturers increase output while cutting expenses!

Minnesota Mining & Mfg. Co., Dept. PF951
St. Paul 6, Minn.

( ) Please send 1951 edition of "Step UP Production."

( ) Have a 3M Methods Engineer call.

Name.....

Firm.....

Address.....

City.....Zone.....State.....

Made in U.S.A. by Minnesota Mining & Mfg. Co., St. Paul 6, Minn., also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3-M" Adhesives. General Export: Minn. Mining & Mfg. Co., International Division, 270 Park Avenue. New York 17, N.Y. In Canada: Minn. Mining & Mfg. of Canada, Ltd., London, Canada.

TABLE I

REQUIREMENTS OF FUNTIONAL FINISHES

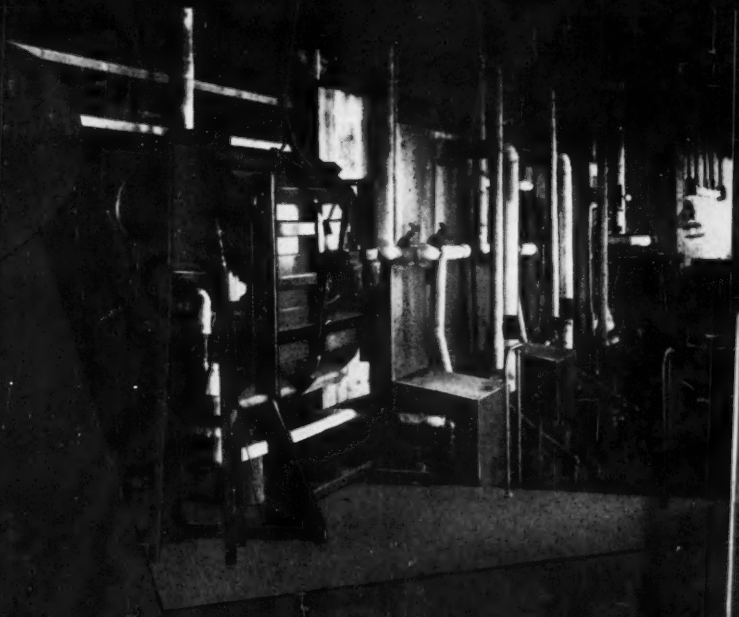
CATEGORY	FUNCTION (Other than decorative)
Primer	To provide better adherance, appearance, and serviceability to finishing systems. Generally, will have excellent adhesion and "holdout", but will sand rather poorly.
Primer Surfacer	To provide more uniform surfaces, serviceability, improve adherence and appearance. Generally, will have good adhesion, fair-good sanding, fair-good "holdout".
Surfacer	To provide smooth surfaces by obscuring metal irregularities. Generally, will have fair adhesion, very good sanding, but only fair "holdout".
Sealer	To seal pores, scratches, and so on.
Ground coat	To furnish a color ground for subsequent graining or other modification.
Alkali resisting coating	To resist and withstand alkaline service conditions.
Acid resisting coating	To resist and withstand acid service conditions.
Refrigerator white	To serve adequately as white finish for the outside of refrigerators.
Washing machine white	To serve adequately as white finish for the outside of washing machines.
Screw cap white	To serve adequately as a finish which can be fabricated into screw caps after drying.
Silver lacquer	To protect and perserve appearance of silver articles.
Heat resisting coating	To maintain film color, appearance, and integrity under high temperature operating conditions.
Clear bronzing liquid	To serve as a stable binder for bronze powders while affording satisfactory adhesion, and durability.
Appliance white coating	To serve adequately as a white coating for appliances other than refrigerators and washing machines, including such uses as metal cabinets, lighting fixtures, household scales, electrical mixers, juicers, metal furniture.
Sign enamel	To serve as a durable enamel for outside signs.
Exterior varnish	To serve as a durable clear coating for outside exposure conditions.
Hammertone finish or Wrinkle finish	To protect the surface while hiding substrate irregularities or blemishes.

7. Topcoat "holdout"—must be excellent.
8. Sanding properties—must be fairly good.

Since the exposure will be outdoors, water resistance of the primer formulation must be of a high order. Also, because the topcoat will be formulated from gloss materials, enamel "holdout" must be good so that the finished product will present a satisfactory appearance. For this reason too the primer surfacer must sand fairly readily, without gumming the sandpaper,

to page 62→

Want to paint

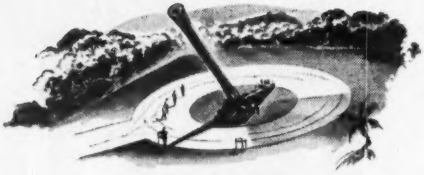


Cincinnati PREPARES THE SURFACE

Cincinnati

CLEANING & FINISHING MACHINERY CO., INC.

IRONTON, OHIO



Keep your

Consult an Industrial Finishes Specialist

No matter what you manufacture for the armed services, highly specialized knowledge is required to get the proper protective coating on your product.

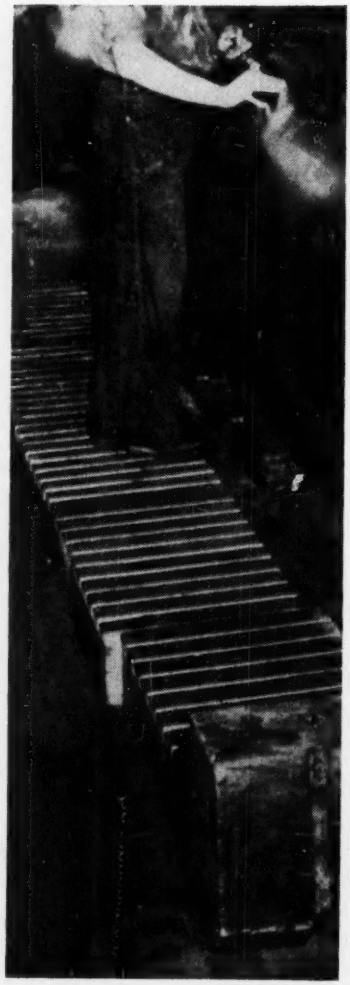
For example, this 16-inch seacoast rifle generates tremendous heat when the gun is fired. The finish must be able to withstand this heat, and also protect the gun from the constant abuse it takes from the elements.

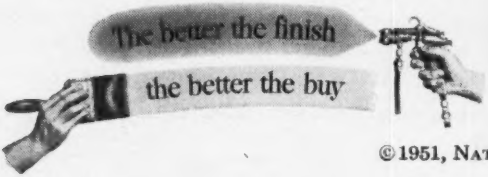
Other products offer comparable problems. Corrosion and heat are only two of the many threats that a quality finish can combat.

Whether you're manufacturing for defense or for civilian markets, it pays to consult your Industrial Finishes Specialist. He knows how to help make your consumer goods more durable and saleable, what are the required specifications for government work, the proper finishes to do any job . . . whatever it may be. For he's the technically trained, sales and production-minded representative of your Industrial Finishes Supplier.

Let him help solve application problems, show you how to possibly cut production cost ...add durability and beauty to your products.

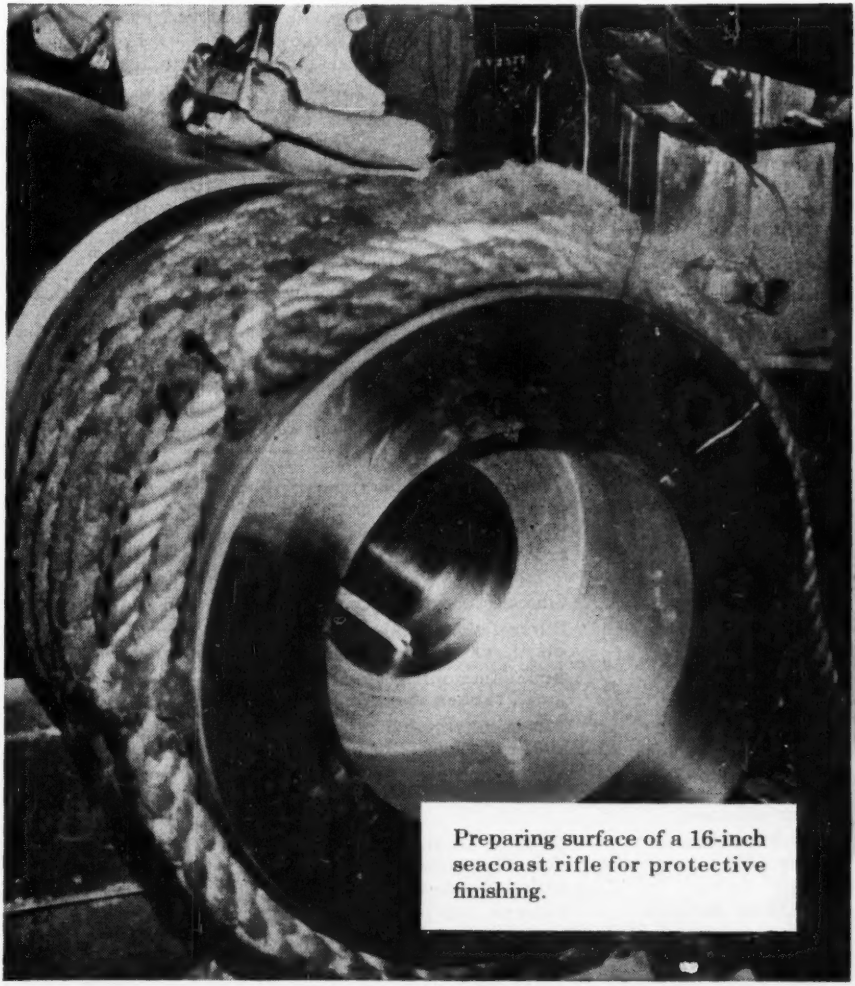
Remember—more and more of your customers *start buying with the finish in mind.*





©1951, NATIONAL PAINT, VARNISH AND LACQUER

defense lines booming . . .



Preparing surface of a 16-inch seacoast rifle for protective finishing.

ASSOCIATION, INC., WASHINGTON 5, D. C.

feather edge suitably, and be free from deep scratches after the sanding operation.

Another point taken into consideration was the critical pigment-volume concentration for each combination of pigments and vehicles with respect to water permeability of the resultant film. Some of the functions of materials used in the primer coating for this specific application are summarized below:

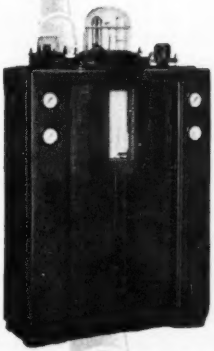
1. Use approximately 20 per cent iron oxide (max. 0.1 per cent water soluble material) for hardness, toughness, "holdout" and hiding.
2. Use approximately 5 per cent zinc chromate to protect against rusting failures.
3. Use magnesium silicate for outstanding sanding properties, suspension.
4. Use china clay for good sanding, enamel "holdout," and drying speed.
5. Use barium sulfate for good film properties, for build, toughness, and hardness.
6. Pigment volume concentrations vary from 25 to 60 per cent depending upon the desired "holdout," sanding and other properties.

TABLE II

VEHICLE GUIDE FOR FORMULATION OF ORGANIC FINISHES

DESIRABLE PROPERTY	RESIN TO USE (only key to resin is shown)
Abrasion resistance	Vinyl, alkyd-amine, chlorinated rubber, epon.
Acid resistance	Chlorinated rubber, vinyl, hydrocarbon, phenolic, acrylic.
Alkali resistance	Hydrocarbon, vinyl, acrylic, phenolic, chlorinated rubber, epon, ethyl cellulose, styrene, melamine-formaldehyde.
Color retention	Silicone, acrylic, alkyd, maleic, amine-formaldehyde.
Fast air dry	Nitrocellulose, chlorinated rubber, styrene-modified alkyd, alkyd, ethyl cellulose.
Fast baking	Amine-formaldehyde, styrene-modified alkyds, chlorinated rubber, thermosetting phenolic.
Flexibility	Alkyd, vinyl, ethyl cellulose.
Hardness Absence-of-tack when warm Mar-proofness	Amine-formaldehyde, thermosetting phenolic.
Heat resistance	Silicone, acrylic, lauric acid alkyd.
Low cost	Tall oil vehicle, styrene-modified vehicle, ester gum, hydrocarbon.
Outdoor durability	Silicone, 100 per cent phenolic, methylene disalicylic acid alkyd, alkyd, cellulose acetate, cellulose acetobutyrate, acrylic.
Salt spray resistance	Vinyl, epon, chlorinated rubber, phenolic, acrylic.
Water resistance	Vinyl, epon, chlorinated rubber, acrylic, phenolic, silicone, hydrocarbon.

CHLORINATION *Employed...* CYANIDES *Destroyed*



The treatment of cyanide wastes is a difficult problem which is growing more acute daily. Increasingly stringent stream pollution legislation has placed a heavy demand on industry for the complete destruction of cyanides.

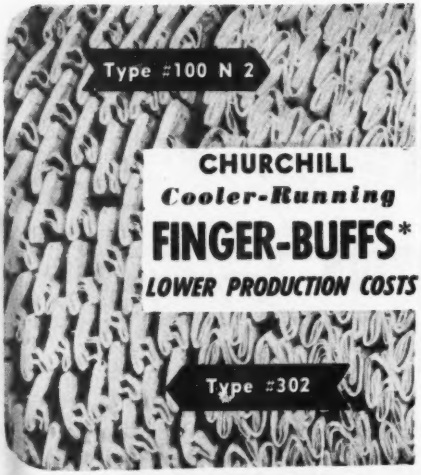
Effective, economical treatment of cyanide wastes requires versatile equipment and experience. The Wallace & Tiernan organization brings you both from its record of equipment installations in over 25 cyanide waste treatment plants.

A complete line of W&T Chlorinators and Chemical Feed Equipment, backed by 37 years experience in the chlorination of water, sewage and industrial wastes, is an assurance that there is always available from W&T a proven chlorinator to fit the needs of your particular cyanide waste problem.

Write today to arrange for a visit from your W&T Representative or for technical bulletins on cyanide waste treatment.

S-63a

WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES



LOWER COSTS of Production

Churchill Finger-Buffs'* "self-air-cooled" buff fingers, provide longer buff life and greater production capacity.

for every Surface Finish

Construction of Churchill Finger-Buffs* can be regulated to produce the type of finish you want on any metal surface.

for every Buffing Requirement

Churchill Finger-Buffs* give you superior performance at lower cost for every buffing, polishing and de-burring need.

*Churchill Finger-Buff, Trademark reg.

REPRESENTATIVES IN PRINCIPAL CITIES

Geo. R. Churchill Co., INC.

FREE Catalog

Dept. PF, North Quincy 71, Mass.

Please send me FREE Catalog and complete information. My special buffing problem is .....

Name ..... Title .....

Firm .....

Street .....

City ..... Zone ..... State .....

7. Alkyds and phenol modified alkyds have been found to give good all-round performance in this application.

Primers for a specific job should be tested alone and in conjunction with the topcoat to be used, to check adhesion, water-resistance, flexibility, and "holdouts" of the completed system. Priming paints containing a substantial quantity of zinc chromate pigment have been found to be the most effective primers for use on aluminum, particularly under conditions of severe exposure. Zinc yellow primers are also widely used for magnesium alloys; a suitable primer of this type is covered by Army-Navy Specification AN-TT-P-656a. The qualities of the paint vehicles used in the primer coating are also important because they have a large part in determining the adhesion properties of the coating as well as its resistance to moisture.

White Baking Enamel

Points to be considered in the formulation of an appliance white baking enamel to meet the requirements summarized below were discussed by Glazer:

1. The enamel will be used on the reflecting surface of a fluorescent lighting fixture.
2. The enamel will be applied by normal spraying at room temperatures.
3. The metal will be properly degreased and phosphatized before the enamel is applied.
4. The available baking cycle is 10 min. at 300 deg. F. in a gas fired, indirectly heated convection oven.

Since in this application the painted fixtures will be handled while still warm, it is necessary to select an enamel which will be hard and marproof at a temperature approximating 150 deg. F. Since the finished product is a lighting fixture, reflectance from the finished surface must be high. In order to maintain a high reflectance value over an operating period of years, the

PHOSPHATE COATING CHEMICALS FOR SPECIFICATION FINISHES

METAL	GOVERNMENT SPECIFICATION	ACP SPECIFICATION CHEMICAL
STEEL	JAN-C-490, Grade I U.S.A. 57-0-2, Type II, Class C U.S.A. 51-70-1, Finish 22.02, Class C	*"GRANODINE"*
	U.S.A. 57-0-2, Type II, Class B U.S.A. 51-70-1, Finish 22.02, Class B	*"PERMADINE"*
	U.S.A. 57-0-2, Type II, Class A U.S.A. 51-70-1, Finish 22.02, Class A	*"THERMOIL-GRANODINE"*
ALUMINUM	MIL-C-5541 MIL-S-5002 AN-F-20 U.S. Navord O.S. 675 16E4 (Ships)	*"ALODINE"*
ZINC	QQ-P-416 RR-C-82 JAN-F-495 AN-F-20 U.S.N. Appendix 6	*"LITHOFORM"*

"GRANODINE"®

"GRANODINE" forms a zinc phosphate coating on steel and zinc surfaces. This non-metallic bond holds and protects the paint finish and thus preserves the metal underneath.

"LITHOFORM"®

"LITHOFORM" makes paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE"®

"ALODINE", the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal painted or unpainted.

"PERMADINE"®

"PERMADINE" forms an oil-adsorptive zinc phosphate coating on steel, which, when treated with rust inhibiting oil, is highly corrosion resistant.

"THERMOIL-GRANODINE"®

"THERMOIL-GRANODINE" forms a manganese-iron phosphate coating on steel, which, when oiled, provides wear-resistance for rubbing parts — and, when oiled or painted, inhibits corrosion.

Write for Information and Descriptive Folders

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

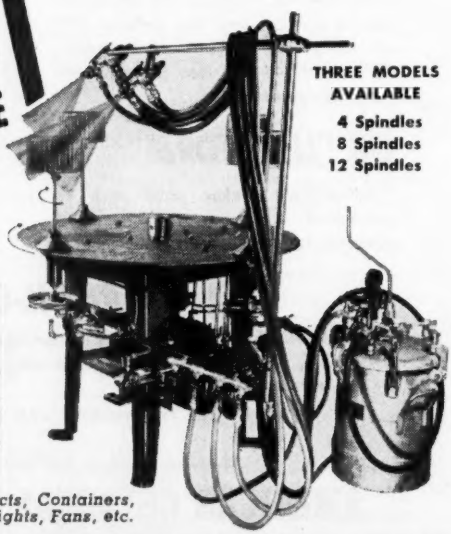
Manufacturers of METALLURGICAL, AGRICULTURAL and PHARMACEUTICAL CHEMICALS

enamel formulated must be non-yellowing. In order to obtain optimum reflectance properties, the painted surface must be smooth and quite free from orange-peel and sags. As reflectors are occasionally washed with soap and water, the baked out finish must have good resistance to washing with warm soapy water.

The pigment selected for this application was a color-retentive grade of titanium dioxide, chosen because of its whiteness, hiding power, and resistance to discoloration. Since whiteness and brightness are to remain high, the use of an alkyd-amine combination for a binder is suggested. It is important that the alkyd selected is not of the oxidizing type, or yellowing and loss of reflectance will occur. Another important component of the finishing system is the volatile thinner necessary to impart good sprayability. A pigment-binder weight ratio of 75 to 100 is satisfactory for the intended application when using rutile titanium dioxide. This ratio has been found to give satisfactory hiding and good gloss in the type of vehicle being used in this case.

Concerning the vehicle, considerations of performance indicate that the alkyd portion should be a short oil resin based on soya, cotton seed, coconut or castor oil, or perhaps a combination of two or more of these oils. The alkyd chosen must also have perfect compatibility with the amine resin to be used. The coconut oil alkyd alone, according to Glaser, while possessing excellent color and color retention properties, confers inferior hardness and adhesion to the final film. Non-drying oil vehicles, in general, exhibit inferior adhesion to metal. Semi-drying or drying oil vehicles usually produce coatings with good adherence to metal. Combinations of coconut oil and any of the other oils, made into a short-oil, amine-compatible alkyd will give excellent adhesion, color retention, and

HOLLAND
automatic-pneumatic
SPRAYING MACHINE



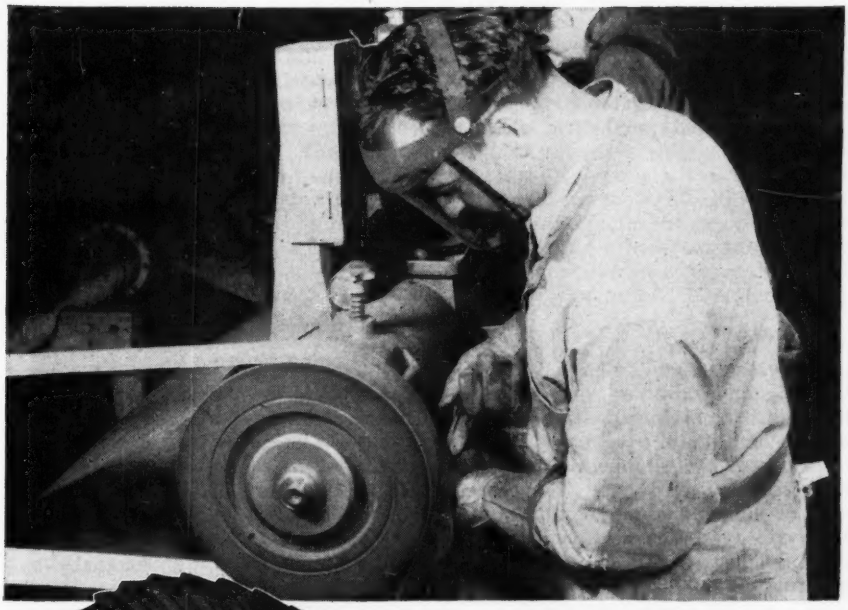
THREE MODELS AVAILABLE
4 Spindles
8 Spindles
12 Spindles

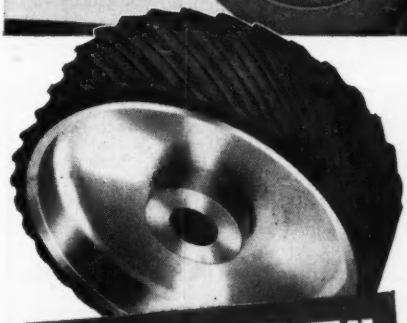
• GIVES AN EVEN FINISH
• SPEEDS UP PRODUCTION
• IMPROVES QUALITY OF PRODUCT

This new fully automatic, portable spraying machine is activated *solely* by air pressure. Only one operator is needed to load, and remove finished and unfinished work. WRITE FOR FULL INFORMATION.

Ideal for spraying: Cans, Novelties, Compacts, Containers, Aluminumware, Electrical Appliances, Flashlights, Fans, etc.

J. HOLLAND & SONS, INC. ▪ 276 SOUTH 9th ST., BROOKLYN 11, N. Y.





New "61" CONTACT WHEEL by CARBORUNDUM TRADE MARK

Twice the belt life in backstand grinding!

Try one simple change in your present backstand set-up. Using the same backstand grinder, the same type of abrasive belt by CARBORUNDUM, remove the contact wheel and replace it with our new serrated rubber "61" wheel.

Put the machine back to work. See for yourself how stock removal rates go up, how much longer the belt cuts, how belt changes are reduced. Watch for a better finish, less fatigue from your operator. Best of all, check your abrasive costs. They may be as much as 50 per cent less. See your CARBORUNDUM representative or distributor about the new "61" wheel. Or write Dept. PF 82-127.

Only CARBORUNDUM TRADE MARK

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, N. Y.

makes ALL Abrasive Products ...to give you the proper ONE

82-127

whiteness. An alkyd resin containing approximately 42 per cent phthalic anhydride, 36 per cent of the combined oils, with the remainder composed of the conventional polyhydric alcohols will give a suitable resin for this application. For the amine part of the binder, either urea-formaldehyde or melamine-formaldehyde resins may be used; for the specified baking schedule, an alkyd to urea-formaldehyde ratio of approximately 3-2 is indicated.

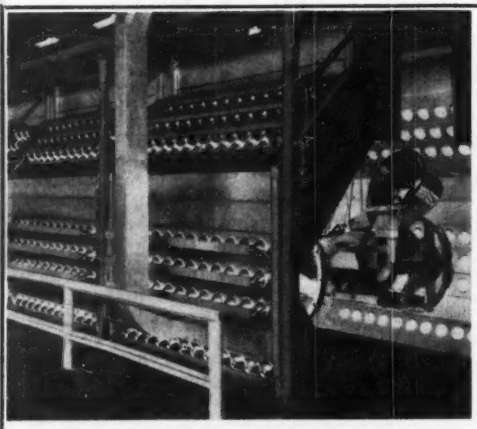
Avoiding Gas Checking

Suggestions were given by Glaser for avoiding the familiar "gas-checking" sometimes experienced with amine finishes which may be caused by acid fumes from the combustion of fuel or from some other source. The correction of finishing room conditions to eliminate oven fumes is one desirable practice. Where this cannot be done immediately, the following additions to the enamel were suggested:

1. An alkyl phosphoric acid—to set the film before it can be attacked.
2. Wax solution—to protect the film by having an insoluble wax float to the top and act as a mechanical barrier.
3. Some form of acid-acceptor which will combine with the troublesome acids and then volatilize has been found effective. Diethylamine, triethanolamine (0.1—0.5 per cent based on enamel) and other compounds have been found effective.

Dipping Enamel Formulation

According to Glaser, the white fixture enamel just studied would make a suitable dipping material with an increase of the pigment-binder ratio to 90 or 100 and a change of thinning solvent to 50 per cent VM&P naphtha and 50 per cent butanol by weight. In dipping enamels a high aromatic hydrocarbon content will frequently cause a condition called "wash," where-



A Triangle Infrared Oven installation at J. I. Case Co., Racine, Wisconsin. Complete tractors (except tires) are finish baked in 19 minutes. The same finish required 45 minutes to 1 hour in a convection oven.

Break the production bottle-neck with a

TRIANGLE INFRARED OVEN

If you want your

BAKING • DRYING • PREHEATING

done faster, safer, more economically and consistently uniform—

If you need every foot of floor space and cannot afford costly experiments, let us make a time and temperature test of your product. The results will show you what a TRIANGLE INFRARED OVEN can do, and the report will tell you how much time you can save. There is no cost; it's part of our service.

Complete data on request.

TRIANGLE EQUIPMENT COMPANY, INC.

Designers, Engineers, Manufacturers

45 RIVER ROAD • NUTLEY, NEW JERSEY

...While Removing Oxide Scale Quickly and Completely

Nopco 1067-A has a unique ability to reduce surface tension in mineral acid solutions. This means it affords *high drain-off* of the acid solution during pickling, resulting in appreciable savings of sulfuric acid in pickling baths.

In addition, Nopco 1067-A permits complete acid removal to be achieved with fewer rinsings, and reduces the possibility for acid contamination during operations following pickling.

In a word, the addition of this unusual liquid surface tension depressant to acid solutions offers the following important advantages:

Savings of sulfuric acid solution—since, on the average, carry-over losses can be cut 30% to 40% . . .

Savings in time and labor—since better drain-off means fewer rinsings . . .

Savings in operations following pickling—since thorough acid removal prior to such operations prevents contamination of lubricants, and thus increases life of dies and other tools . . .

PLUS faster, deeper, and more uniform penetration of oxide scale.

In the light of current restrictions on the use of sulfuric acid, you'll find Nopco 1067-A exceptionally helpful in any type of acid pickling—plating, wire manufacture, galvanizing or anodizing.

Mail us the attached coupon today. We'll be glad to supply you promptly with full information.

**Reg. U. S. Pat. Off.*

NOPCO
EVOLVED THRU RESEARCH

NOPCO CHEMICAL COMPANY
Harrison, N. J.

BRANCHES: Boston • Chicago
Cedartown, Ga. • Richmond, Calif.

Nopco Chemical Company
Harrison, New Jersey

Gentlemen:
Please send me full information about Nopco 1067-A

Name .....
Firm .....
Address .....
City ..... Zone ..... State .....

in the parts adjacent to edges or perforations are incompletely covered. Another point brought out was the desirability of tinting a white dipping enamel if at all possible. A small amount of tinting with lampblack, for instance, will effect great improvements in hiding, especially near upper edges. Fineness of grind and suspension should be carefully checked in the formulation of dipping enamels to obtain maximum opacity and to prevent hard settling of gritty particles in the bottom of the dip tank.

In the formulation of colored dipping enamels, besides the usual dipping properties, conditions known as floating and flooding may be encountered. Flooding was defined as that condition wherein a homogeneous color comes up to the surface of the paint film, whereas a slight touch of the finger to the wet film will reveal that the underneath color is entirely different. Floating is a condition wherein heterogeneous streaks of color are visible in the direction of the drain. Various additives have been recommended to remedy this condition, some of which are given below:

1. 1 to 2 per cent soya lecithin.
2. 0.1 to 1.0 per cent fatty acids.
3. Small amounts of zinc naphthenate or zinc resinate.
4. Very finely divided calcium carbonate.
5. Small amounts of rosin or gloss oil.
6. Small amounts of fatty acid monoglycerides.
7. Small amounts of certain silicone fluids.

Heat Resistant Finishes

Heat resistant finishes comprise a class used in the finishing of stoves, heaters and burners of various types. Glaser pointed out that although many types of organic finishes will withstand long exposure to temperatures

to page 74→

A NEW CORROSION-RESISTANT LINING

for Tanks and Ducts

Applied in your own plant

FAST, EASY, ECONOMICAL

- Acid and alkali resistant Polyethylene coating, developed by Linde Air Products Company, a Division of Union Carbide & Carbon Co.
- Quickly and easily applied in your own plant with portable flame spray equipment by our trained operators.
- Practically any metal can be coated by this new process.

Write us about your coating problems!

Tank Coatings, Inc.

834 East Bay Drive, Babylon, L. I., New York

Precious
METAL
Solutions
AND
Salts
FOR
THE
PLATER
RHODIUM PLATING SOLUTION
PLATINUM PLATING SOLUTION
PALLADIUM PLATING SOLUTION
CONCENTRATED GOLD PLATING SOLUTION No. 319
CONCENTRATED REPLENISHING SOLUTION No. 320
CONCENTRATED UNDERPLATE OR STRIKE No. 3215
GOLD COLORING SOLUTIONS
HIGH GOLD CYANIDES
COMMERCIAL GOLD CYANIDES
SILVER SALTS — SILVER ANODES
Send for the Baker Guide to Successful Plating with Gold
BAKER & CO., INC.
113 ASTOR ST., NEWARK 5, N. J.
NEW YORK
SAN FRANCISCO
CHICAGO

nation on the move

Every mode of transportation — from baby carriages to the luxury liners that slice the waves—relies on *plated* surfaces not only for decoration but for protection of vital parts against wear and rust. And for these longer-lasting, more uniform plated finishes builders of bicycles, motorcycles, automobiles, trains, trucks, ships, planes look to Hanson-Van Winkle-Munning and *Platemanship*.

What does *Platemanship* mean? It means H-VW-M's unique array of assets . . .

. . . a modern laboratory geared to work with all industry in developing and perfecting improved, more efficient plating processes, equipment and supplies

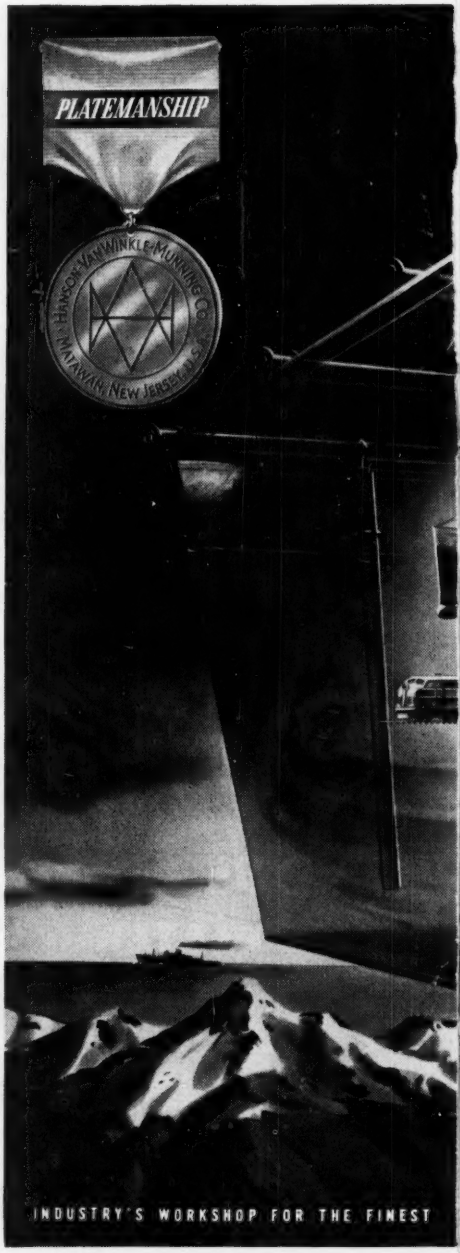
. . . the ability to assume entire responsibility for *all* plating needs from polishing brushes to low-voltage generators to fully-automatic precision plating conveyors designed and built to specifications and using specially formulated processes

. . . a background of thorough knowledge of every phase of plating, polishing, buffing, cleaning and anodizing which has grown steadily since the inception of the industry.

The field of transportation is only one phase of modern life that looks to H-VW-M's *Platemanship* for precision and uniformity. *All* industry relies on H-VW-M for sound advice and dependable, complete service on every plating and polishing need.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.
PLANTS AT: MATAWAN, N. J. • ANDERSON, INDIANA
SALES OFFICES: ANDERSON • BOSTON • CHICAGO • CLEVELAND • DAYTON
DETROIT • GRAND RAPIDS • MATAWAN • MILWAUKEE • NEW HAVEN
NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • SPRINGFIELD
(MASS.) • STRATFORD (CONN.) • UTICA

H·VW·M



IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

up to 350 deg. F. without perceptible change, thermal decomposition will occur at temperatures substantially exceeding this figure. While discoloration, loss of gloss, and loss of film integrity will occur with most organic coatings at exposures of 400 deg. F., or higher, for several hours, these features are most noticeable with white enamels. To make a good heat resistant white enamel, a vehicle with minimum oxidizing tendencies is required. Alkyds made from saturated oils or fatty acids are generally utilized. To give hard films, the alkyd is combined with urea-formaldehyde or melamine-formaldehyde resins.

There are some high-heat applications where pale color is not a factor. According to Glaser, for these applications the alcohol-soluble heat reactive phenolic finishes may be used with good results. Also, excellent heat resistant materials are made from the acrylic polymers, (the harder acrylics such as methyl methacrylate polymer being preferred) when plasticized with a suitable plasticizer, such as chlorinated diphenyl. This type of formulation was reported to withstand temperatures exceeding 400 deg. F., and maintain excellent color and gloss. However, the finish has poor adhesion to steel and usually requires the use of a primer coat to obtain a suitable finished product.

The silicone resins are used in making some of the best heat resistant coatings. In appearance, silicone resin paints look the same as paints made from conventional vehicles. Silicone finishes may be applied by any of the conventional methods—brushing, silk screening, spraying, dipping or roller coating. They possess a higher degree of heat resistance than any other type of organic coating.

Various types of silicone paints are on the market. For some applications, it has been found necessary to supplement the desirable heat-resistant properties of the silicone resins with the good features of other compounds in order to obtain such necessary film characteristics as adhesion, toughness and rapid drying speed. Such finishes are generally known as "modified silicone finishes."

The utility of an aluminum pigmented, modified silicone finish may be realized from a consideration of the following specification given by Glaser which was drawn up by the engineering department of a large user of these finishes:

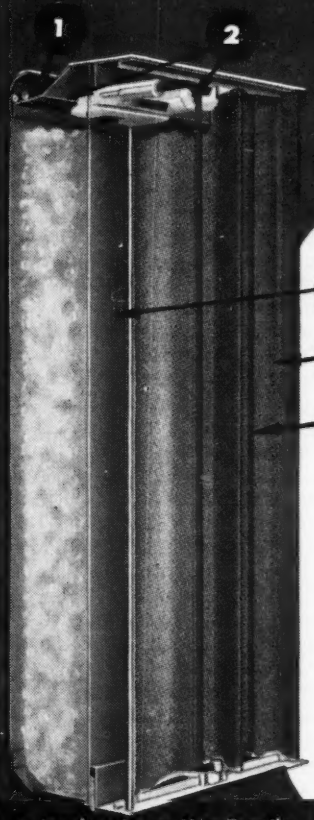
Metal Treatment	Chemically clean all surfaces using a light phosphate coating, grit-blasting, or sandblasting.
Paint application	Spray or dip paint to dry film thickness of 0.0015 inch.
Baking schedule	10 minutes at 350 deg. F.
Durability tests	1. Panels so finished shall withstand a 30 deg. bend around a 3/16 inch diameter rod at 20 deg. F. without cracking. 2. Panels so finished shall withstand 1000 deg. F. for one hour without showing any signs of deterioration. 3. Panels so finished must withstand immersion in water at room temperature for 24 hours without showing signs of blistering or checking. 4. Panels so finished must withstand immersion in motor gasoline for 4 hours at room temperature. Within 24 hours after removal from the gasoline the immersed portion shall be equal in hardness, toughness and film anchorage to the unimmersed portion. 5. Panels so finished must withstand weathering in a weatherometer for 500 hours without cracking, checking, or rusting.

Never Before

SO MUCH HEAT
SO QUICKLY RESPONSIVE
SO ACCURATELY CONTROLLED at
SO LITTLE COST

for

ANY SIZE PRODUCT
ANY HEATING OR DRYING APPLICATION (Up to 650° F.)
ANY PRODUCTION QUANTITY
ANY HANDLING METHOD
ANY COLOR OR MATERIAL



1. No wiring in high heat zone.
2. All vital parts serviced externally.
3. *Low Thermal Mass* inside insulated enclosure means quick on-and-off heat response.
4. Lifetime reflectors in 3 optical designs.
5. Long-life radiant CALROD* heaters. Plug-in, lock-in. Standard makes, voltages, sizes.

*REGISTERED U.S. PATENT OFFICE

Heat capacity: 4 to 40 kw. at 800 to 8000 BTU/hr/sq. ft.

Build-as-you-go Panel Heat

—as easy as this:

Heater panels are field assembled on standardized interchangeable frame members, which also house the electric wiring; Makes later changes in size, production capacity, or heating cycle a matter of inserting or rearranging readily available standard parts.

Send for details now on Build-As-You-Go Panel Heat

- Insulated
- Accessible
- Long Life
- Safe
- Non-Fragile
- Responsive
- Dependable
- Low Cost

ADVANCE HEATING DIVISION
Jensen Specialties, Inc.
9331 FREELAND AVENUE • DETROIT 28, MICHIGAN

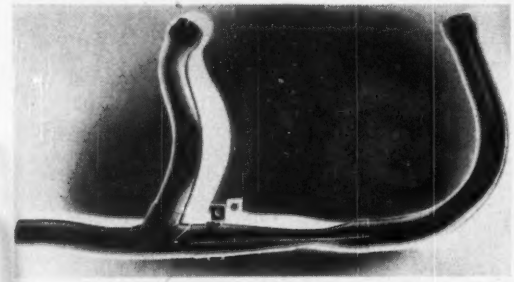


Fig. 2 — A typical Harley-Davidson motorcycle part which receives a silicone type finish for heat and corrosion resistance. (*Photo courtesy the Harley-Davidson Co., Milwaukee, Wis.*)

According to Glaser, this type of modified silicone finish has been used in such applications as: oil and gas heating equipment; incinerators; mufflers; exhaust systems; electrical equipment; heat exchangers; steam retorts; high pressure steam lines; lead pots; furnace casings; arc light reflectors; gas range shields and baffles. The Harley-Davidson motorcycle features silicone finished cylinders, exhaust pipes, and mufflers for corrosion resistance and durability. Figure 2 shows one part that receives a silicone finish in this application.

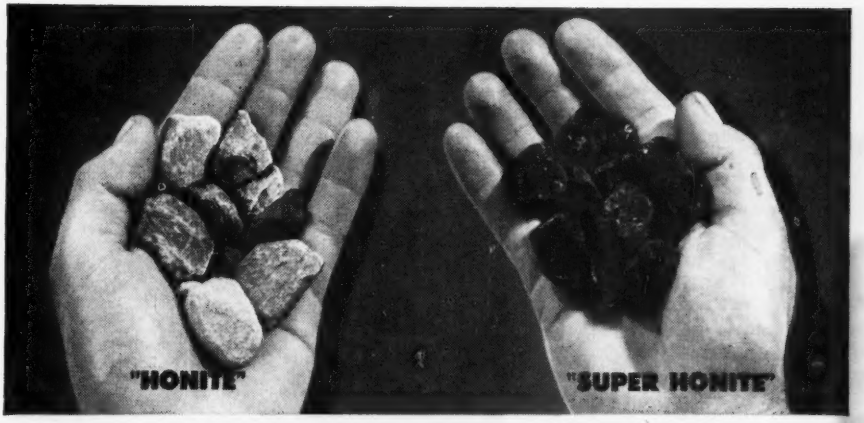
Dow Corning Corporation reports that modified silicone coatings have been used satisfactorily at temperatures from 500 to 1000 deg. F. on industrial equipment such as ovens, smokestacks, exhaust mufflers, and space heaters. The silicone resin based coatings also have good chemical resistance, a particularly desirable property, as corrosive atmospheres are present in many industrial applications. One of the most promising developments in the field of silicone protective coatings is a silicone-fatty acid-glycerol product recently announced by Dow Corning. This material may be combined with alkyd resins to produce finishes possessing the most desirable properties of both the silicone and alkyd resins. Dow Corning reports that white enamels formulated with the new product have heat resistance and gloss retention that is superior to the alkyd-melamine white stove enamels.

Formulations To Meet Other Requirements

According to Glaser, a styrene-modified-alkyd melamine-formaldehyde resin combination gives outstanding performance as a white baking enamel for washing machines. Outstanding properties of this type of finish are high alkali resistance, coupled with good whiteness, color retention, adhesion, and hardness. If a high degree of acid resistance as well as alkali resistance is desired in the formulation of a pigmented finish for steel, a vinyl resin plasticized with a soft acrylic resin is to be recommended. In some cases chlorinated rubber modified with a non-saponifiable plasticizer of the chlorinated diphenyl type might give a more economical finish. Pigments used in such finishes should be carefully chosen so as to be acid and alkali resistant.

Outdoor clear vehicles of the baking type may be made from alkyds alone or from mixtures such as 60 per cent urea-formaldehyde resin and 40 per cent glycerol alkyd resin. While phthalic alkyds may be used with good results, outstanding performance is obtained with alkyds made from aliphatic dibasic acids such as sebacic, and azelaic. Castor oil is a suitable oil modification. Although somewhat expensive, these compositions are superb in color, color retention, flexibility and outdoor durability. They require baking for approximately 15 minutes at 325 deg. F. to polymerize.

Materials which dry by solvent evaporation may also be used as outdoor



New! Two tough chips speed barrel finishing

Get smoother, faster barrel finishing with the toughest abrasive chips on the market—"Honite" and "Super Honite!"

"Honite" retains a cutting edge longer than any other *natural* barrel finishing abrasive. It's ideal for fine finishing to close tolerances, and for many other jobs involving a minimum amount of metal removal.

"Super Honite" is a heavy, *synthetic* stone that gives more than twice the life of other abrasives—the only stone engineered for both grinding and finishing.

And, like other stones, "Honite" and "Super Honite" work best in combination with "Honite" Compounds—the "secret of success" for dependable, consistent finishing results.

Stop expensive "guessing" for the *right* materials and methods! Experienced 3M Engineers are ready to work with you to help you get best barrel finishing results at the lowest possible cost. Use coupon below for complete information and a copy of "3M Barrel Finishing." No obligation.

Minnesota Mining & Mfg. Co.
Dept. PF-9, St. Paul 6, Minn.

Name.....
Firm.....
Address.....
City.....Zone...State.....

Honite® BRAND

BARREL FINISHING CHIPS • COMPOUNDS • EQUIPMENT

Made in U.S.A. by MINNESOTA MINING & MFG. CO., St. Paul 6, Minn., also makers of "Scotch" Brand Pressure-sensitive Tapes, "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Adhesives. General Export: Minn. Mining & Mfg. Co., International Division, 270 Park Avenue, New York 17, N. Y. In Canada: Minnesota Mining & Mfg. of Canada, Ltd., London, Canada.

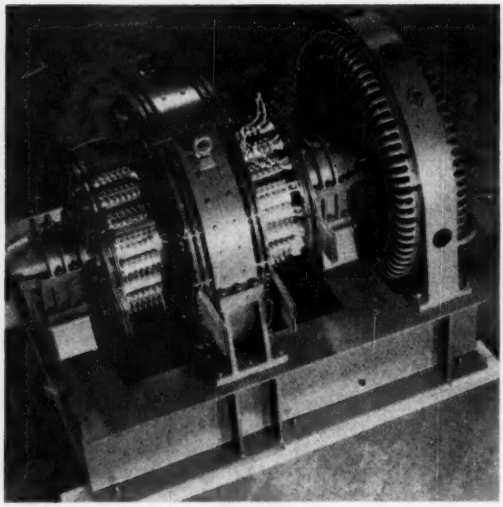


Fig. 4—A view of a 15,000-ampere, 6-volt (7,500 at 12 volts), 40-deg. C., double commutator, interpole type, shunt wound generator, separately excited by a 230-volt d.c. source, and driven by a 150 h.p., 440-volt, 3-phase, 60-cycle, unit power factor synchronous motor. (*Photo courtesy Hansen-Van Winkle-Munning Co., Matawan, N. J.*)

protective clears. Glaser cited the methacrylates as having very good resistance to outdoor weathering. Cellulose acetate, modified with suitable resins and plasticizers, and cellulose acetate-butyrate similarly modified make good outdoor clears for many purposes.

* * *

D. C. Power Source for Plating Should Be Dependable and Efficient

THE d.c. power source for plating operations should be modern and efficient so it can be relied upon to carry the peaks of the heavy production, as well as be efficient and as economical as possible during lull business periods. Some of the points to consider in determining whether a motor-generator set or a rectifier should be used as the power source in plating operations have been given* by E. G. Schroeder, The Electric Products Company. This decision may involve the evaluation of seven major factors: initial cost; voltage regulation; operating efficiency; power factor; mounting space required; installation cost; flexibility. Figures 3, 4 and 5 show modern commutator type motor-generator sets such as used in plating operations, which feature easy accessibility and all-welded fabricated steel construction. Figure 6 shows a rectifier for electroplating and Figure 7 is a view of a bank of rectifers mounted on a platform well above the plant plating area.

The largest single factor in favor of

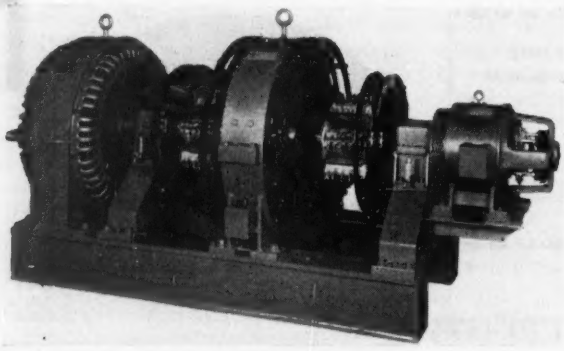
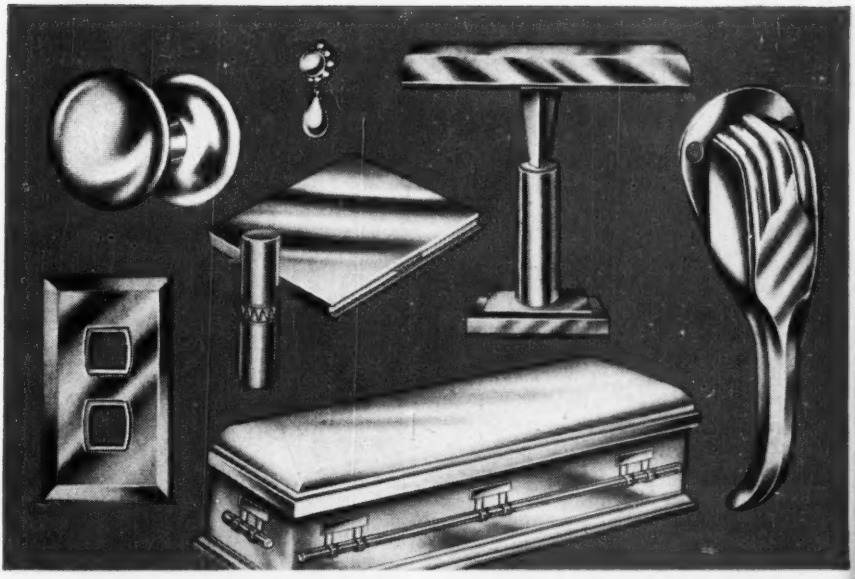


Fig. 3—A modern commutator-type motor-generator set, such as used in plating, which features easy accessibility and all-welded fabricated steel construction. (*Photo courtesy The Electric Products Co., Cleveland 12, Ohio*)



NOW... simulate copper, brass and bronze on products like these with M & W PLATELUSTRE

Don't let critical metals put a *needless* crimp in your production!

Take zinc or steel—apply a coating of one of the new PLATELUSTRE finishes. You wind up with products and parts that look so much like copper, brass and bronze that *the eye can scarcely tell the difference!*

Whether you have been using now unavailable copper and its alloys for *making* products or for *plating* products, you will find these new M & W finishes *equally* effective in keeping your plant running. There are types for air-drying and baking schedules—pick the one that best fits *your* production requirements.

Let an M & W Technical Service Engineer show you—*right in your own plant*—how easy these PLATELUSTRE coatings are to use, and what striking effects they produce. Or, if you prefer, write for free literature.

PIONEERS IN PROTECTION

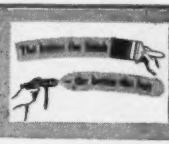
75th ANNIVERSARY • M&W CO. 1876

MAAS & WALDSTEIN CO. 438 RIVERSIDE AVE. NEWARK 4, N. J.

MID-WEST DIV. - 1658 CARROLL AVE., CHICAGO 12, ILLINOIS

PACIFIC COAST DIV. - SMITH-DAVIS CO., 10751 VENICE BLVD., LOS ANGELES 34, CAL.

MANUFACTURERS OF INDUSTRIAL FINISHES



the rectifier is its lower cost in the smaller ampere capacities. However, the first cost of the equipment is dependent upon the load curve of the particular plating operation. This is a reliable guide in determining whether a rectifier or an m-g set should be used. It is generally agreed that a rectifier is suitable for short-time overloads, but not for continuing overloads. Thus, in the load diagram in Figure 8 the short-time overload between points A and B could be handled safely by a rectifier, but not the one shown between points C and D. If the overloads are of the nature indicated by the curve between points C and D, the rating of the rectifier would have to be increased to the peak rating of the long-period overload.

Voltage regulation of a rectifier is generally thought to be poorer than that possible with a motor-generator set (Figure 9). Another point concerns operating efficiency. In this case the larger the installation in terms of kilowatts of power, and the hours of operation per day, the more the installation favors the m-g set. Conversely, smaller amounts of power on a shorter day, or intermittent operation favors the rectifier. While the rectifier does not operate at poor power factor, it does not contribute to the correction of power factor to compensate for inductive type loads. This is important in the average plating operation because of the polishing and buffing machines which are driven by inductive

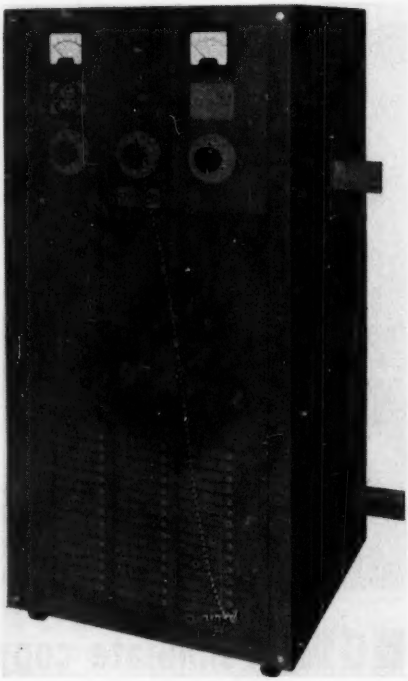


Fig. 6—Illustration shows a 1,500-ampere, 9-volt self-contained rectifier. *(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)*

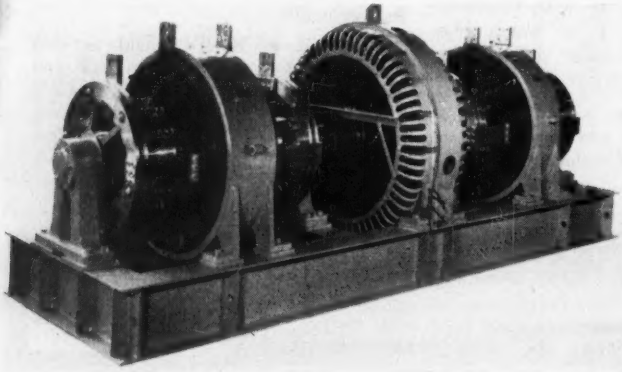
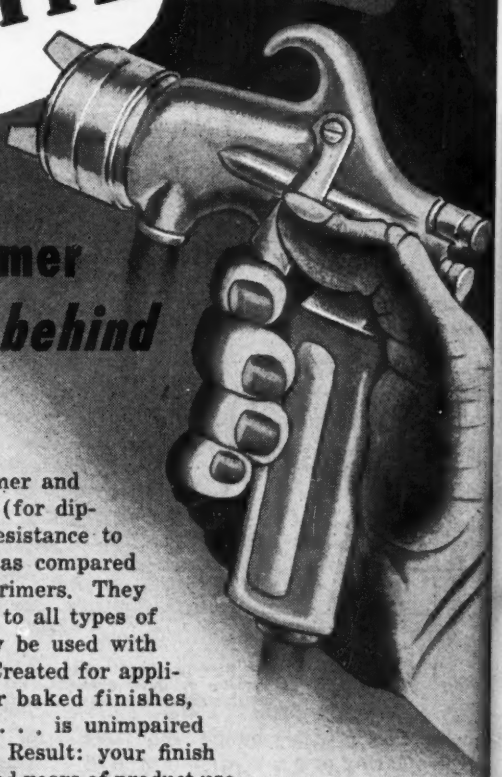


Fig. 5—A typical synchronous motor generator set consisting of two 5,000-ampere, 12-volt, 2,500-ampere, 24-volt, 450 r.p.m., Columbia DC generators driven by one 200 h. p., 1.0 p.f., 2,300-volt, 3 phase, 60 cycle, 450 r.p.m. Columbia synchronous motor. *(Photo courtesy Columbia Electric Mfg. Co., Cleveland 14, Ohio)*

STANTITE



the wash primer that *stands behind* your finish

STANTITE Spraying Primer and STANTITE Clear Primer (for dipping) offer outstanding resistance to corrosion and rust creep, as compared with conventional wash primers. They provide excellent adhesion to all types of metallic surfaces and may be used with most types of top coats. Created for application under air-dried or baked finishes, STANTITE dries rapidly . . . is unimpaired by any baking schedules. Result: your finish looks like new through added years of product use. Find out now what STANTITE can do for your product . . . for complete information write today to the Stanley Chemical Company, 21 Berlin Street, East Berlin, Connecticut.

STANLEY

Industrial Coatings

STANLEY CHEMICAL

LACQUERS SYNTHETICS JAPANS ENAMELS

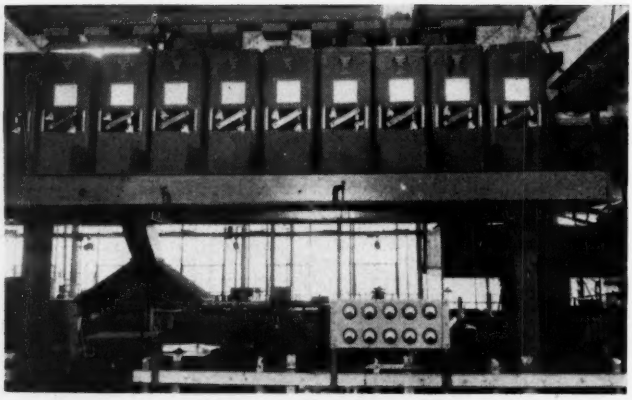


Fig. 7 — This illustration shows how a battery of rectifiers may be mounted in close proximity to plating operations. No additional floor space is required. (*Photo courtesy The Udylite Corp., Detroit 11, Mich.*)

motors and which operate usually below rated load and at relatively poor synchronous motors which afford an economical solution to the power factor correction problem.

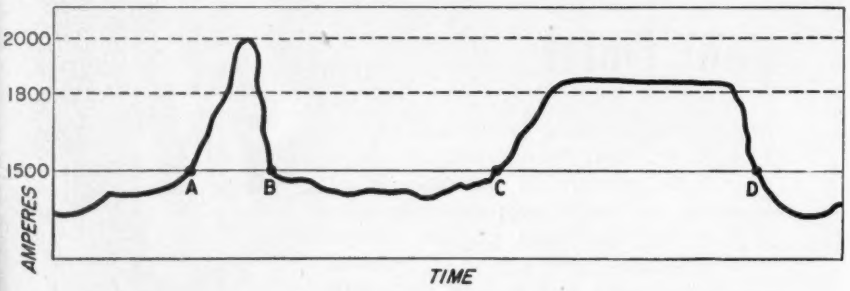


Fig. 8—Load curve for plating operation is a reliable guide in determining whether a rectifier or motor-generator set should be used. (*Illustration courtesy "American Machinist"*)

As a general rule, for small amounts of power the rectifier will mount in a smaller space than the m-g set. As the installation is increased and it is power factor. All medium and large electroplating m-g sets are powered by

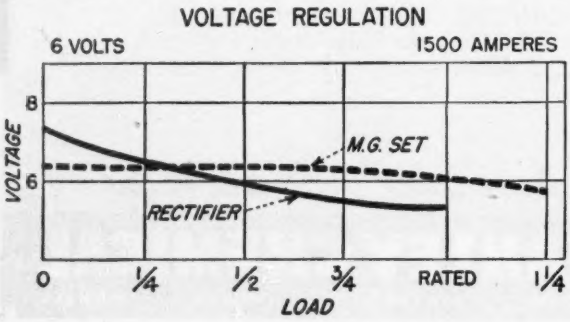


Fig. 9 — Voltage regulation characteristics of the motor-generator set as compared to those of the rectifier. (*Illustration courtesy "American Machinist"*)

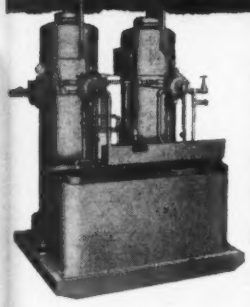
A Discovery!

Lower *"TOTAL-PIECE-COST"* is truly a delightful discovery when you run a production test of BUFFING NU-SPRA-GLU, *SIEFEN'S* Liquid Compound, on Bright Copper Buffing.

J. J. Siefen CO.

For PURE Water

INDUSTRIAL
WATER DEMINERALIZERS



Mill Room Water
Nickel Dip Solutions
Neutralizer Solutions

Cost analyses are proving that the use of raw water in metal coating processes is not so cheap after all. This is especially true when mineral-free water can be obtained for a matter of cents per 1000 gallons in any quality with an INDUSTRIAL water demineralizer.

The operation is very simple. Raw water is passed through alternate beds of ion-exchange resins, and it comes out free of all mineral salts. No steam, heat, still, or cooling water is needed—keeping space requirements at a minimum.

It's simple to get the complete facts for your case. Send us a water analysis and let us know how much water you have to treat and the gallons per hour needed. We can then give you the whole demineralizer story including estimated costs, equipment required, performance data, etc., for your requirements.

Write for full recommendations

INDUSTRIAL FILTER & PUMP MFG. CO.

5904 Ogden Avenue Chicago 50, Illinois

of power the rectifier will mount in a smaller space than the m-g set. As the installation is increased and it is necessary to add a number of rectifier units, this saving disappears. A single rectifier unit can usually be installed more economically than a single m-g set because it is usually recommended that a base be provided for the generator whereas the rectifier can be set on the floor or mounted on some lighter type of construction. Other installation requirements for a number of rectifier units in one location usually offset this advantage as compared with a larger m-g set.

* AMERICAN MACHINIST (June 12, 1950).

The gavel presented to A.E.S. President C. F. Nixon at the recent A.E.S. Convention in Buffalo serves as an interesting example of the use of lacquer coatings in an electroplating process.

Presented by T. R. Bogess, of The Norfolk and Western Railway Company, the gavel was carved from Virginia ash wood, and was finished by the following process:

1. Coat with Ucilon stop-off lacquer.
2. Spray with metallic lacquer containing bronze powder.
3. Acid copper plate.
4. Buff.
5. Silver plate.
6. Buff.
7. Spray with clear air dry lacquer.

Coal and grain chutes made of porcelain enameled steel regularly outlast ordinary steel conveyor chutes by as much as ten times. This special grade of porcelain enamel is highly resistant to abrasion. In addition, the smooth, glass-like surface reduces friction, thereby speeding up loading operations.

The kindly word that falls today may bear its fruit tomorrow.—*Gandhi.*

HARSHAW
supplies Industry with

Electroplating Salts
Anodes & Processes

Synthetic
Optical Crystals

Driers
and Metal Soaps

Agricultural
Chemicals

Ceramic Opacifiers
and Colors

Chemical
Commodities

Fluorides

Fungicides

Glycerine

Preformed Catalysts
AND
Catalytic Chemicals
FOR PETROLEUM AND
OTHER ORGANIC PROCESSES

HARSHAW
SCIENTIFIC
Supplies chemicals
and apparatus for
your laboratory.

HARSHAW

THE HARSHAW CHEMICAL CO. • CLEVELAND 6, OHIO

Cleveland • Chicago • Cincinnati • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh

HARSHAW SCIENTIFIC DIVISION OF THE HARSHAW CHEMICAL CO. CLEVELAND 6, OHIO

Cleveland • Cincinnati • Detroit • Houston • Los Angeles • Philadelphia

PRACTICAL APPLICATIONS of Modern Products

Finishing Small Parts in One System

A NEW system which washes, phosphatizes, rinses, dries, paints, and bakes generator regulator covers at a rate of 1,440 units per hour has recently been installed at the Ypsilanti plant of the Ford Motor Company.

Designed and engineered by the Cincinnati Cleaning and Finishing Machinery Company, the system is extremely compact (floor space: 21 by 14 feet; height: 10 feet); and is made as an integral assembly so that it can be moved to any location in case a new plant arrangement is desired. Tunnel openings, for conveyor and parts, in

Fig. 1—A view of the finishing equipment showing the loading and unloading area. Covers may be seen emerging from the baking oven at upper left; wash pump and tank in lower center, and rinse pump and tank in right background of picture.

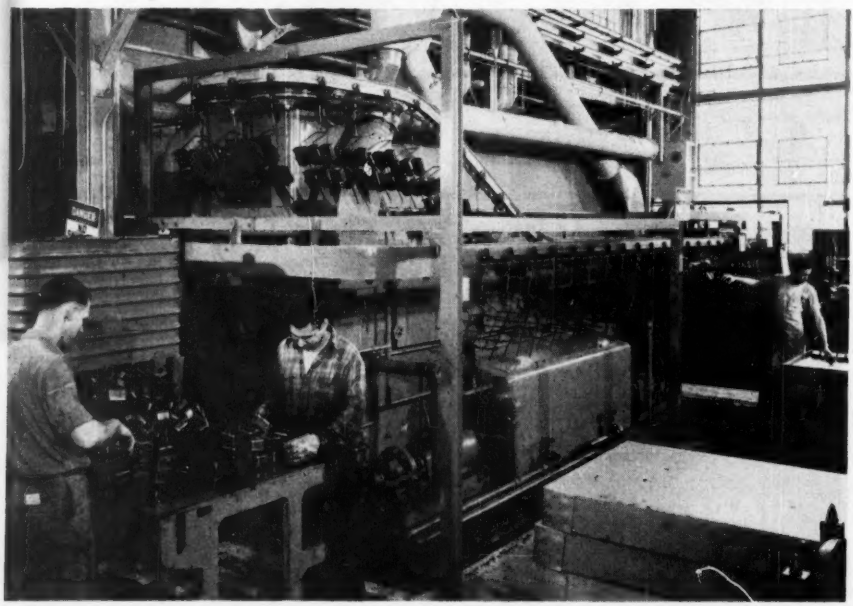
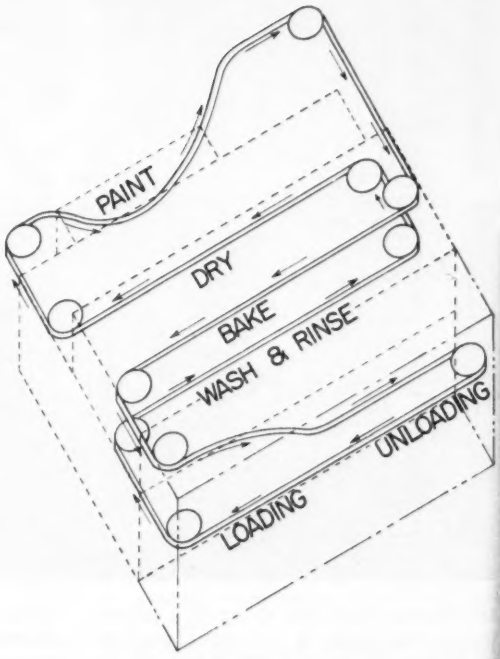


Fig. 2—Schematic flow chart of the finishing process.



the various components of the system are 18 by 18 inches.

The covers which are finished in this system are 5 inches long, 3 inches wide, and 1¾ inches deep. Parts are mounted on fixtures, six per rack, and are attached to a Keystone Junior No. 228 monorail conveyor on 12-inch centers (see Fig. 1), which travels through this finishing system at a rate of approximately 4 feet per minute.

In operation, the parts are loaded onto the fixtures and then pass through the first section, which is approximately 18 feet long and divided as follows: approach, 3 feet; wash and phosphatize, 6 feet; drain, 4 feet; rinse, 2 feet; and drain, 3 feet.

In this section the cleaning and phosphatizing are accomplished in one operation with a solution containing iron-phosphate, which is used at a temperature of 180 deg. F. The covers are then rinsed in water at 180 deg. F. and allowed to drain. In both operations, washing and rinsing, the liquids are sprayed on the parts from top, bottom, and sides by Vee-jet nozzles which are mounted on spray pipes at 12-inch centers. The washing solution is pumped from a 710-gallon tank by a pump rated at 250 g.p.m., and the rinse is pumped from a 460-gallon tank by a pump rated at 100 gallons per minute.

Following these operations, the conveyor makes a 180-degree turn and brings the parts through an infra-red drying oven where all traces of moisture are evaporated. The oven is kept at 250 deg. F. by use of four banks of Chromalox glassless infra-red heaters with a total power capacity of 60 kilowatts. Air is reused by means of a recirculating system employing fans of approximately 1,500 c.f.m. capacity.

Leaving the drying oven, the covers make another 180-degree turn and, descending, travel through a paint dip tank. This dip tank is approximately 10 feet long, 4 feet wide, and 1 foot 8 inches high, and has a capacity of 173 gallons (see Fig. 3). It is mounted on top of a paint storage tank, which is 6 feet 4 inches long and has a capacity of 121 gallons. The two tanks are connected by a 2½-inch drain pipe with a carbon-dioxide actuated quick-opening valve for rapid drainage in case of fire. Further fire protection for the unit is assured by a carbon-dioxide system with nozzles located in the tank and paint drip area.

From the dip tank the parts enter the baking oven by making another

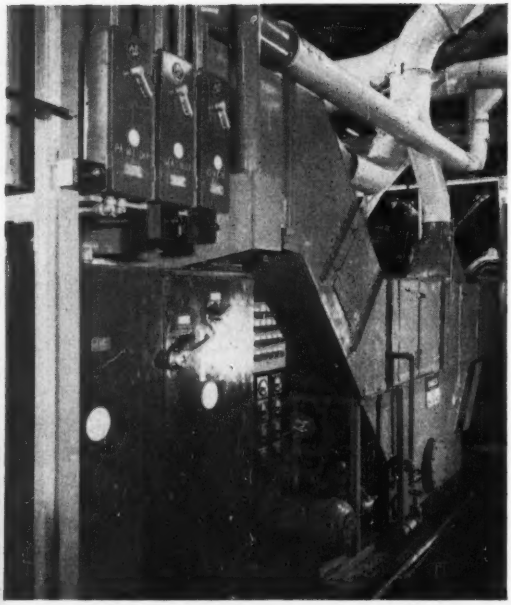


Fig. 3—A view of the paint dip tank and paint storage tank.

180-degree turn and rising to a higher level. This oven is located above the washing unit with a difference in elevation of only 3 feet 3 inches.

The paint baking oven is very similar to the drying oven except that it is kept at 350 deg. F. It also uses four banks of Chromalox glassless infrared heaters. The total power of this oven is 38 kilowatts, and it is equipped, like the other oven, with temperature controllers.

From the baking oven the conveyor dips down to the normal elevation of 6 feet and enters the loading and unloading area. As may be seen from Fig. 1, the covers go through the system at an angle to permit better drainage and eliminate air bubbles in the dipping operation.

This equipment, although designed specifically for Ford Motor Company's generator regulator covers, is applicable to any finishing process where small parts are to be finished in large quantities. However, sizes of each unit can be varied according to the parts which are to be finished.

Finishing Time Reduced 50 Per Cent With Hot-Spray Lacquer

DOUGLAS Aircraft Company is now using hot-spray lacquer for finishing many metal parts, including aluminum, at the El Segundo, California plant.

According to a report sent to Hercules Powder Company, manufacturer of the nitrocellulose ingredients from which lacquers are made, the use of hot-spray lacquer is growing steadily at Douglas. Their process engineers report that a time-saving equivalent to 27½ hours in finishing AD-4 airplanes has been realized. Booth time alone was cut nine hours, or one third, with present crews and equipment. Where two coats of finish were required before, one coat of hot lacquer now gives the required film thickness. This eliminates "scuff sanding" and the hazard of sanding through the finish on rivet heads and skin laps, in turn, affording better protection in service.

In addition to the time-saving factor, Douglas engineers reported the hot-spray lacquer process saved the equivalent of two gallons of lacquer and eight gallons of thinner per plane.

Thorough tests, to meet Navy specifications, proved to Douglas that hot-sprayed lacquer has better flow-out, decreases tendency to sag, blush or orange peel, and provides a smoother,

glossier appearance. Salt spray and weatherometer tests showed the hot-sprayed film to be superior.

The reduction of finishing time by an estimated 50 per cent resulted in a definite increase in production, accompanied by a cut in finishing costs.

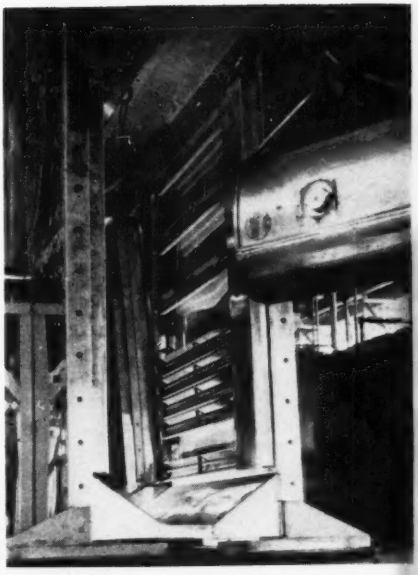
Drying of Tractor Parts Improved by Use of Infra-Red Oven

AT Harry Ferguson, Inc., Detroit tractor manufacturer, drying of tractor parts has been improved by changing from manually-directed hot air blast to a controlled electric infra-red oven, according to a report from the Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pa., manufacturer of the oven. The new conveyorized set-up automatically dries widely varying part sizes and shapes for paint spraying, and substantial savings have resulted from the changeover.

Arrangement of the heaters in the oven is shown in the accompanying photograph. Each of the two oven halves contains 14 Chromalox electric radiant heaters on a 230-volt line—six vertical ones rated at 2.5 kw. each and eight horizontal ones rated at 1.8 kw. each. The latter are spaced so as to concentrate more heat in the area through which the heaviest sections of metal pass. A power blower located behind the vertical heaters drives high velocity air through the oven.

The metal parts are conveyed through the eight-foot oven at a rate of 25 feet per minute, and the parts temperature is raised well above boiling point in the 20-second exposure time. The parts leave the oven and cool in the 50-foot travel to the paint booth.

To accommodate the fuel tank, which has soldered joints, the heaters are equipped with variable heat control.



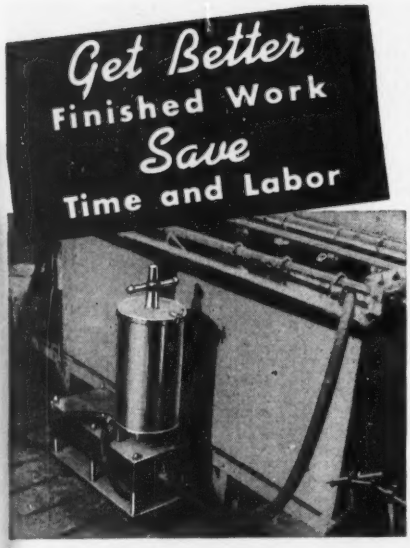
A tractor fuel tank entering the infra-red oven.

Heat is applied at the highest intensity possible without softening the soldered joints.

Treatment of Forming, Stamping and Cutting Oils to Ensure Good Cleaning

IT sometimes happens that a cleaning routine, having been thoroughly satisfactory for years, suddenly fails to produce the familiar results. This is true, not only on still tank cleaning operations, but on the cleaning stages of automatic plating machines, where the work is cleaned and rinsed just before passing to the plating machine.

The cause, in almost all cases, is a change in the formula of the forming, stamping or cutting oil, which poses a cleaning problem which is essentially different from the one where the pre-



With a "Sealed-Disc" Filter

You'll get better finished plated work, save time and labor and you'll get longer service life from your plating solutions. More and more cost-minded platers depend on Alsop *"Sealed-Disc"* Filters, to remove all dirt, dust and oil-sludge from their solutions and keep their solutions free from even the invisible impurities that cause trouble. Users of *"Sealed-Disc"* Filters save time and labor, they know that their clean work is being put into bright, clean solutions. Regardless of the size or type of your installation, there's a *"Sealed-Disc"* Filter to *"fit your job"*—write for complete information or contact your regular plating supplier.

Write to:

ALSOP ENGINEERING CORPORATION

609 Keen Street, Milldale, Conn.

ALSOP ENGINEERING CORPORATION

Filters, Filter Discs, Mixers, Pumps, Tanks

viously used cleaner was perfectly satisfactory. In many cases the determination of a new cleaning routine is apt to take a lot of time, even assuming that the change in cutting oil formula is recognized as the source of trouble.

A recent case of this kind leads the Magnus Chemical Company of Garwood, N. J., to suggest a different approach to this problem. Magnusol, the emulsifiable solvent cleaner which is used for precleaning metal objects prior to cleaning b e f o r e plating, can be used as an additive to the forming, cutting and stamping oils to act as insurance that the existing cleaning method will continue to do the job expected of it, regardless of any changes made in the formula of the lubricating compounds.

Proportions of Magnusol used may vary somewhat with the oil used, but experience indicates that 1 part Magnusol to 6 parts of the oil will be adequate in most cases. The Magnusol has no effect on the lubricating qualities of the oils, but it does act as an agent to ensure a good cleaning action once the metal pieces are brought in contact with the cleaning solution. Moreover, Magnusol is compatible with all types of cleaning agents, so that its only effect is to provide an added cleaning action and ensure complete cleaning, regardless of the formula of the oils used in forming the metal.

CHEMSTEEL CONSTRUCTION COMPANY, INC.

301 Chemsteel Bldg., Walnut St., Pittsburgh 32, Pa.

Send data on Engineering & Construction facilities for

ACID-ALKALI-PROOF CONSTRUCTION

of processing & storage tanks & flooring in

☐ Steel Plant ☐ Chemical ☐ Textile ☐ Food

NAME.....

COMPANY.....

ADDRESS.....

CITY..... ZONE ..... STATE ....

Switch to

HOUGHTO-BLACK

one-bath
Metal Finish

LOW COST!

LONG LIFE!

ATTRACTIVE!

RUST RESISTANT!

WON'T AFFECT TOLERANCES!

Replace costly, critical plating materials with easy-to-get Houghton Houghto-Black. It provides a lasting finish. Can't crack or peel off. This permanent coating is being successfully applied to mass production without special equipment . . . at lower cost! Get full information on the simple, one-bath Houghto-Black process from E. F. Houghton & Co., Philadelphia 33, Pennsylvania.

HOUGHTO-BLACK

. . . a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

NEWS of the Industry

NEW PLANTS

THE MacBETH CORP., and subsidiaries, Newburgh, N. Y., manufacturer of pH meters, photometers, optical instruments, and color matching lights, has announced the acquisition of a second plant in Newburgh for the manufacture of optical and electronic instruments.

This represents a doubling of present manufacturing and research facilities and a fourfold increase in its plant size since the firm moved to its present site from New York City early in 1950.

COMPANIES

DIAMOND ALKALI COMPANY has announced plans for an expansion project at its silicate of soda plant at Dallas, Texas. The new project calls for the installation of a large furnace to supplement the production of three smaller-type furnaces now in operation. The present furnace building will be remodeled to accommodate the expanded facilities.

The Dallas plant was constructed as a one-furnace plant in 1941. A second furnace was added in 1945, a detergent plant was built in 1946, and the third furnace was placed in operation in 1948.

The Dallas plant is one of six silicate plants Diamond operates throughout the country. It has twelve plants in all, and manufactures over 100 basic chemicals.

At a recent seminar at the home office in Detroit, men of the cold forming department of **PARKER RUST PROOF COMPANY** heard James Leland explain a new development in shell case manufacture using Bonderite as an aid.

Mr. Leland, manager of the cold forming division, stated that Bonderite, used in a variety of cold forming applications, is making possible greater reductions in drawing, and has meant the difference between success and failure in many severe extrusions.

James Leland is shown discussing the development of Bonderite as an aid to extrusion to sales, research, engineering and service field men.

This year the **PHILADELPHIA QUARTZ CO.**, Philadelphia 6, Pa., is celebrating 120 years of continuous business.

Founded in 1831 by Joseph Elkinton for the manufacture of soap and candles, the business expanded rapidly when the production of silicate of soda was begun. Its use in the Elkinton soaps showed a distinct advantage for increasing washing action. Silicate sales to other soap makers were inconspicuous until the war between the States brought an embargo on Southern rosin to the North, and soap makers became interested in substituting silicate for rosin. The new soaps found favor with consumers, and silicate of soda became an established product. Soaps and candles still were manufactured in the Elkinton factory although with the introduction of the kerosene lamp, candle sales were waning.

The increased acceptance of silicate as a soap-making ingredient soon required greater production. In 1864 a large factory was built at 9th and Mifflin Streets, Philadelphia, and the present firm name came into use. Again in 1889, business growth justified expansion to the West, with a silicate factory in Anderson, Indiana. At the beginning of the present century, the acceptance of the corrugated paper box as a shipping container resulted in utilizing another of silicate's properties—adhesiveness, which had been discovered earlier. A new plant in Chester, Pennsylvania, was devoted exclusively to manufacturing silicates of soda. At that time, the Philadelphia factory was closed and soap making discontinued.

Through the company's research over a long period of years, series of chemicals were produced by varying the proportions of the ingredients of silicate of soda, which led to a variety of useful applications. From the original use of the product in soaps, the list of industries now using silicate of soda is long.

Besides the Anderson and Chester units, plants today are located at Baltimore, Md.; Buffalo, N. Y.; Jeffersonville, Ind.; Kansas City, Kansas; Rahway, N. J.; St. Louis, Mo.; and Utica, Ill. A subsidiary, Philadelphia Quartz Company of California, operates three plants —Berkeley, Los Angeles, California, and Tacoma, Washington. Another subsidiary is National Silicates Limited, Toronto, Ontario, Canada. Thomas W. Elkinton, great grandson of the founder, is president of the Eastern and Canadian companies, and a director of the California company. The present directors of Philadelphia Quartz Company are J. P. Elkinton, J. G. Vail, T. W. Elkinton, W. Martin, J. A. Norton, C. L. Baker, A. W. Elkinton, E. A. Russell, J. C. Russell.

One of several paint manufacturing concerns recently visited by French members of an ECA Productivity Team was the **ARCO COMPANY**, Cleveland, Ohio.

The group was welcomed by Arco president, Howard E. Wise. After discussions on sales, advertising policy, industrial relations and research the team went on a tour through the plant. A special buffet lunch was awaiting the visitors in the plant's cafeteria.

Purpose of the team was to study production, equipment and merchandising methods used in the paint, varnish and printing ink industry and to apply the knowledge thus gained in the United States to increase the efficiency and productivity of the French industry. Team members represented management, engineers, and skilled workmen and were from Paris, Bordeaux and Marseille.

French members of an ECA Productivity Team pause in front of one of the buildings of the Arco Company on their tour through this plant.

SIMONDS ABRASIVE CO., grinding wheel and abrasive manufacturer, Philadelphia, Pa., announces new branch office and warehouse facilities in both Chicago and Detroit.

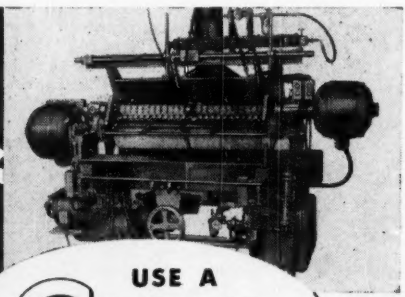
The Chicago warehouse, located at 3323 West Addison Street, is occupied jointly with the parent company, Simonds Saw & Steel Co., Fitchburg, Mass. In Detroit, the new warehouse is located at 17155 Conant Avenue and offers an enlarged and expanded grinding wheel and abrasive service.

Salesmen from both the powdered metals and metal oxide units of the **GLIDDEN COMPANY'S** Chemical and Pigment Division now are equipped to sell all products manufactured by the division according to an announcement made by J. P. Ruth, vice president in charge of the division. The new program was established to eliminate duplication of effort and to provide top service to all customers.

Intensive laboratory study of the Chemical and Pigment Division's products has been made by the entire sales force, Mr. Ruth said, and men from the two units are working in pairs learning the techniques of selling the various products of the division .

The new sales policy was outlined to all salesmen of the division at a recent meeting at the division's plant in Hammond, Indiana. Ralph Quelos, general sales manager of the division, directed the meeting. Others present included Mr. Ruth, G. M. Halsey, director of manufacturing for the division; W. R. Kelley, manager of the division's plant in Collinsville, Ill., and E. P. Palmer, general manager of the Hammond plant.

QUAKER CHEMICAL PRODUCTS CORP., Conshohocken, Pa., manufacturer of special chemicals, has purchased approximately 3½ acres of ground on the Christiana River and Reading Railroad at Third and Heald Streets, Wilmington, Delaware. At present this property has six buildings, and also a boiler house, tanks, piping, and electrical facilities. Only slight reconstruction and installation of new equipment will be necessary before the plant can be put into complete operation as an independent unit.



USE A
CLAIR
MACHINE

From the seven basic Clair designs, a custom-made machine can be developed to give greatest efficiency in your surface finishing operation. With totally enclosed, abrasion-proof hydraulic circuits and adjustable controls, Clair Machines provide the precision and trouble-free operation necessary for efficient surface finishing on a production basis.

Write for technical data.

CLAIR

MANUFACTURING CO., INC.
Specialized Machine Equipment For Glazing and Polishing Operations
OLEAN, N. Y.

28 Years of Experience In the Sale and Service of

CHEMICALS TO CLEAN and PREPARE METAL for PAINTING

Surphos CLEANER AND PRODUCER OF PHOSPHATE COATINGS.

Sol-Klean PHOSPHORIC ACID RUST MOVER AND ETCHER.

Industro ALKALI CLEANERS, STRIPPERS AND AIR WASH COMPOUNDS.

Industrosolv SOLVENT EMULSIONS FOR SPRAY WASHING MACHINES

SOL-KLEAN prepares steel and aluminum for painting, removing rust, oxide and oil. It etches the metal and gives a thin phosphate coating. One volume of Sol-Klean, diluted with 3 volumes of water, usually brushed on the metal at room temperature. It penetrates oil and dissolves rust. Sol-Klean is removed together with the dissolved oil and rust by wiping with rags or flushing with water. Metal may also be cleaned and treated by immersion in hot Sol-Klean and rinsing in water. Sol-Klean is non-inflammable and evolves no toxic or corrosive fumes.

SURPHOS cleans and produces a phosphate coating on sheet steel, machined and cast iron. It anchors the paint finish and increases its humidity and salt spray resistance. Use hot (one ounce per gallon solution) in Power Wetting Machine or dip tank. Acid proof equipment not needed.

NOTE:
Consult Us On Your Government Specification Requirements

INDUSTRIAL CHEMICAL PRODUCTS COMPANY
3778 BELLVUE AVENUE DETROIT 7, MICHIGAN
Representatives In Principal Cities
IN CANADA, MADE AND SOLD BY BOYLE CHEMICALS LTD. LONGBRANCH, ONT.

Although Quaker expects to turn out 35 per cent of its production at Wilmington, the main offices, laboratories, and factory will remain in Conshohocken, where further expansion is planned. Land adjacent to the present property has been purchased, and a pilot plant unit, a large warehouse, and several buildings have been constructed.

The first of a new series of clinics on finishing developments and problems was recently conducted in New Haven, Connecticut, by **MAAS & WALDSTEIN CO.**, Newark,, N. J., Chicago and Los Angeles, manufacturer of industrial finishes. Subsequent clinics will be held in key market centers across the United States as an educational program to assist the finishing industry.

B. F. Ames, general sales manager of Maas & Waldstein, spoke at the New Haven clinic on the subject, "Organic Finishes as Substitutes for Plated Surfaces."

"The development of organic finishes that can be effectively used in place of plated surfaces using such scarce metals as copper, brass, nickel and chromium has been one of the most important results of our recent research work at Maas & Waldstein Company," said Mr. Ames.

Two members of the M & W Field Engineering staff discussed the subjects of electrostatic spraying of finishes, its field of usefulness and its limitations; and of the care and handling of spray equipment.

A question-and-answer period following the talks lasted more than two hours, indicating the interest of the audience in the topics discussed.

The 1,000,000 pounds monthly increase in the production of refined nickel by Inco, predicted by the end of this year at the company's annual meeting last April, has now been achieved, Dr. John F. Thompson, chairman and president of **THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED**, has announced. This increase in nickel production is a result of the major program of expansion of underground mining capacity, metallurgical process changes, and the installation of emergency facilities at Inco's Canadian plants.

Through this augmentation International Nickel's production will be at capacity of 21,000,000 pounds per month, a higher level than in any peacetime year, it was stated.

PITTSBURGH PLATE GLASS COMPANY has announced that construction is underway on an $8,500,000 expansion of chlorine and caustic soda producing facilities at the Natrium, West Virginia, plant operated by Southern Alkali Corporation, a wholly-owned subsidiary. The building program will include a new cell building for the production of chlorine and an addition to the caustic soda department.

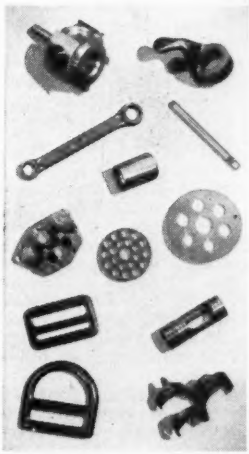
HARDING MANUFACTURING CO., INC. 10634 Gratiot, Detroit, has added a new service particularly aimed at design engineers.

Forty-six engineers, chemists, electroplaters, and representatives of top management in industry attended the clinic recently held at New Haven by Maas & Waldstein Company. B. F. Ames (at table, center), general sales manager of the company, spoke on new finishing developments.

ROTO FINISH

GIVES YOU 5 OUTSTANDING ADVANTAGES

for Deburring, Descaling and Finishing Operations



1. Eliminates tedious hand filing, scraping, polishing, deburring, etc. to save many man hours.
2. Provides absolute uniformity in quantity lots.
3. Maintains exacting tolerances on precision parts where no dimensional change is allowable.
4. Imparts a finish mechanically that was formerly considered possible only by hand methods.
5. Low initial cost — requires minimum maintenance. No exhaust systems required.

Send samples for free demonstration

ROTO-FINISH GUARANTEES RESULTS

HERE'S THE WAY IT WORKS

You buy nothing until analysis proves results will benefit you.

LABORATORY ANALYSIS

Your products are analyzed to determine which combination of equipment and materials will do the best job for you at the lowest cost . . . before you make any investment.

RESULTS GUARANTEED

We guarantee to reproduce the same results in your plant that we have produced on your samples processed in our laboratory.

A COMBINATION OF MATERIALS AND MACHINES

When you buy, you get machines and materials that are properly combined for your job.

Roto-Finish COMPANY

ROTO FINISH

associated with The Sturgis Products Co.

3704 MILHAM RD., KALAMAZOO, MICHIGAN

ORIGINATORS OF THE ROTO-FINISH PROCESSES

ENGINEERING KNOW-HOW

Avail yourself of the unusual engineering skill and ability which is found at the Roto-Finish Company.

CONTINUOUS ENGINEERING SERVICE

Roto-Finish Engineers make periodic visits to your plant to supervise and demonstrate the use of Roto-Finish processes, to train your operators, and to offer helpful suggestions to improve your products wherever possible.

ROTO-FINISH COMPANY, Kalamazoo, Michigan

SPECIALIZATION
Saves You Money
on
THINNERS

We make nothing but Thinners—blended Solvents, and nothing else. Naturally, we buy large quantities of solvents—at lowest prices. *Specialization* saves us money on overhead too—and these savings we pass on to you, our customers.

We know how to formulate Thinners to your requirements—been doing it for 26 years. We've satisfied big and little customers . . . let us show you how a Lacquer Thinner *SPECIALIST* can supply you with the *right* Thinner . . . and still save you money.

Just fill out form below and mail today. We'll work out a Thinner *especially for you*, and send a sample. Think we can do it for 85¢ or less a gallon too!

POTTER PAINT CO., INC.
CORTLAND 2, N.Y.
THINNER SPECIALISTS

The product we make is:_____
We use Lacquer Thinner for:
☐ Spray ☐ Dip ☐ Cleaning ☐ Other_____
We use Lacquer Thinner on:
☐ Metal ☐ Wood ☐ Other_____
We want it to dry:
☐ Fast ☐ Slow ☐ Medium

Name_____
Address_____
City_____ Zone____ State_____

Realizing that engineers would like to visualize a finished product well in advance of production, Harding now will plate any non-metallic parts formed of wood, plaster, or glass. This will give the design engineer an actual idea of the appearance of a drawing board plan or model.

The **AMERICAN RACK COMPANY,** newly founded branch of **NaRaCo,** has moved its Chicago office and plant to 4632 West 21st Place, Cicero, Illinois. William Zube, plant manager of this installation, can be reached by NaRaCo's Chicago area customers by calling Olympia 2-3739.

A new aluminum smelting plant, the first in history to use lignite for fuel, will be built by the **ALUMINUM COMPANY OF AMERICA.** Confirmation has been received stating that the company has applied to the Department of the Interior for a certificate of necessity to begin construction of the plant in the immediate future at one of several alternate locations approximately 60 miles south of Waco, Texas.

The plant, which will have a production capacity of 85,000 tons of aluminum annually when completed, represents another major contribution by ALCOA to the defense program and to the job of meeting civilian demand for aluminum. Production of metal is expected to start in the fall of 1952, and when in full operation the plant will employ approximately 1,000 persons.

NEW POSITIONS

W. CLARK SPRUCE, direct factory representative of the DeVilbiss Company's spray painting and finishing equipment division, has been promoted to Southwest district manager, it was announced by Henry M. Kidd, sales manager of the spray painting and finishing equipment division.

Mr. Spruce, who has been associated with the DeVilbiss Company for more than 23 years, will continue to maintain offices at the company's branch, 1515 Dragon St., Dallas, Tex. In his new position, he will supervise the company's sales activities in the newly created

Switch to

PLATECOIL for

(REPLACES PIPE COIL)

TROUBLE-FREE Tank Heating and Cooling

Platecoils have many times the useful life of pipe coils thus preventing many production delays. When repairs are necessary, plates are changed from outside the tank in a matter of minutes without dumping tank solution. You can save STEEL, MAN-HOURS and MONEY by using Platecoils and you will enjoy TROUBLE-FREE heating and cooling.

NEW Technical Manual No. P50 simplifies the solution of heat transfer problems. Send for your copy today.

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

Why Platecoils Cost Less

LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction.

EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

GREATER TANK CAPACITY

A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

WEIGHS 50% LESS

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

LITERATURE

The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

Kold-Hold Manufacturing Company, Lansing 4, Michigan

(Left to right) Miles K. Holcomb, Michael C. Tamas, James A. Dodd

Southwest district which includes Texas, Louisiana, Mississippi, Arkansas, Oklahoma, New Mexico, a section of western Tennessee, and northwestern Alabama

---

At the regular directors' meeting of Ferro Corp., Cleveland, Ohio, three veteran employees, **GLENN A. HUTT, G. W. WALLACE,** and **E. W. DANY** were elected vice presidents. According to Robert A. Weaver, chairman of the board, the growth of Ferro's business and the diversification of its products created a need for the new offices.

Mr. Hutt has been assistant to the president, in charge of defense work, as well as director of market development and advertising activities. A graduate of Ohio State University with the degree of bachelor of ceramic engineering, he joined Ferro Corporation in 1934 as a service engineer, became assistant sales manager in 1940, was made general sales manager in 1946, and became assistant to the president in 1949.

Mr. Wallace continues as treasurer of the corporation when he assumes the vice presidency. A certified public accountant, he joined Ferro Corporation in 1937. He is a director and executive vice president of Tuttle & Kift, a Ferro subsidiary, as well as director and treasurer of Ferro Chemical Corporation and a director of Ferro Enamels (Canada), Ltd.

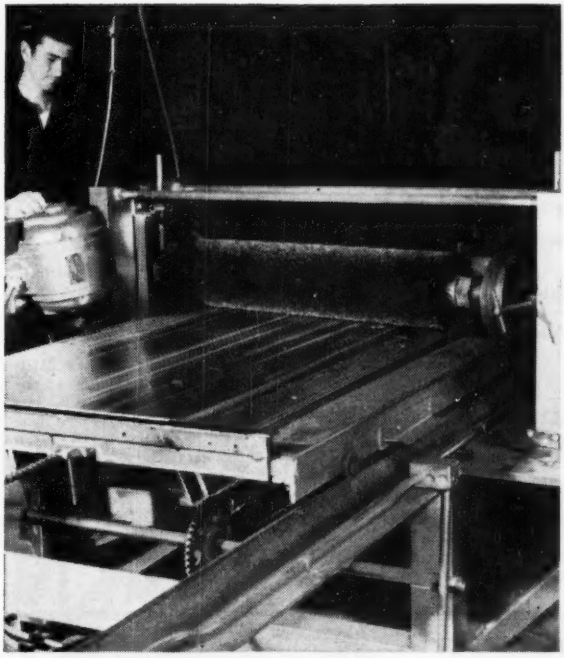
Mr. Dany, chief engineer of Ferro Corporation's Engineering Division, has been in charge of the company's design and engineering work in porcelain enameling furnaces and plants. He received his degree in mechanical engineering from the University of Alabama. He began his career with Ferro in 1927 as a field engineer. His appointment as chief engineer came in 1936. During the last year, Mr. Dany was instrumental in supervising the conversion of many porcelain enameling furnaces in the country to heat-treating units for war production.

The Roberts Rouge Co., Stratford, Conn., recently announced the appointment of three sales representatives for the Connecticut, Michigan, and New York areas.

MICHAEL C. TAMAS, who will be the Connecticut representative, is a graduate of Pratt Institute and a specialist in machine design directed toward the field of metal production and finishing.

JAMES A. DODD, Michigan representative, was for several years executive vice president of the Detroit Chemical Specialties Company. He recently formed the Dodd Abrasives Company in

(Left to right) E. W. Dany, G. W. Wallace, Glenn A. Hutt



THE ALUMINUM DOOR

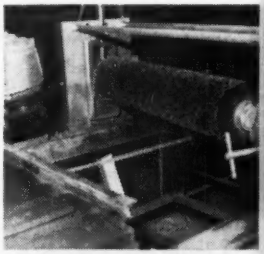
Osborn wire wheel brushes have removed the blemishes and prepared the surface for lacquering.

What takes off the coat and helps the salesmen?

...a brush! Here's a door-way to better aluminum products:

The product is an aluminum door. It was impractical to make lacquer adhere uniformly to the aluminum. With the help of the **O**sborn **B**rushing **A**nalyst, a machine using Osborn wire brushes was built to prepare the surface for lacquering. Result: lacquer sticks perfectly to the brushed surface, giving an attractive, durable finish that helps sales.

The **O**sborn **B**rushing **A**nalyst is opening the door to lower costs and better products of every description. Have him survey your operations, including cleaning and finishing. Call or write *The Osborn Manufacturing Company, Dept. 530, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



THE BRUSHING MACHINE

Door is mounted on a conveying table which travels under Osborn brushes mounted as shown. Brush at left brushes side of door. After traveling one way, door is turned over and table reverses.

OSBORN

LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS

YOU TOO

can have a simple brushing machine to help you produce better, more salable products. Let Osborn show you how.

Detroit at 3215 Bellevue, from where sales and delivery for Roberts Rouge will be handled.

MILES K. HOLCOMB, New York representative, was formerly with the United Aircraft Company. He has been in charge of customer orders at the Stratford factory for several years and will continue to work out of that office.

At a meeting of the board of directors of the Roberts Rouge Co., Stratford, Conn., **ROBERT L. ONKEY** was elected president, **THEODORE F. ONKEY** was elected treasurer, and all the other officers were re-elected acccording to J. E. Harrington, secretary.

American-Marietta Company has announced that **EDWARD F. MARCH** has joined the company as treasurer.

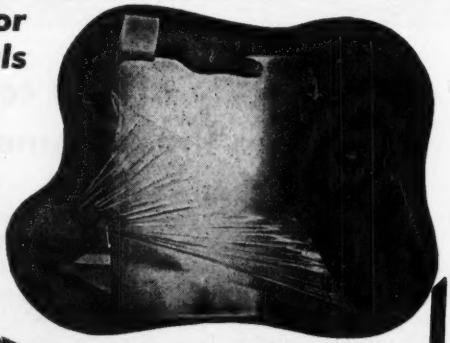
Mr. March comes to American-Marietta from Columbia Mills, Inc., Syracuse, New York, where he was vice president and chief financial officer. Prior to this association, he was treasurer of the Metals Disintegrating Company of Elizabeth, New Jersey, which became a subsidiary of American-Marietta earlier this year.

George S. McCormick

At a sales conference attended by the Midwest representatives, Philip H. Beach, general sales manager of The Egyptian Lacquer Manufacturing Company, announced the appointment of **GEORGE S. McCORMICK** as Midwest sales manager. He will be located at the Lafayette, Indiana plant.

For several years Mr. McCormick has been a sales technician for Egyptian, and he brings to his new position a well-rounded sales and technical experience background.

A Strippable Plastic for the Protection of Metals



Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust. Also available as a booth coat protection.

THE STRIPLASTIC COMPANY

Among many advantages, it is non-toxic, possesses great tensile strength and is easily stripped off in one piece. Write for complete information on this new strippable plastic.

10828 QUEBEC AVE.
CLEVELAND 6, OHIO

How to get Finer Finishes at Lower Costs

with **GLOBE**

Direct Motor Drive

TILTING TUMBLING BARRELS

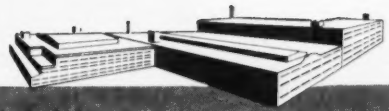
Available in Kiln-Dried Maple or Steel Shells

Process thousands of pieces at one time—faster, better and at lower cost—with Globe Precision Tumbling Barrels, dependable for 47 years. Globe's exclusive six-way work shifting motion cuts tumbling time and increases action. Speeds as low as 30 revolutions per minute assure finer finishes of non-ferrous metal parts. Motor is compactly mounted above the gear segment for space economy.

Free Experimental Service

Hupp's Experimental Engineering Laboratory can show you how to cut finishing costs. Just send samples of the parts to be processed along with a finished part. Write today! There's no charge or obligation.

Hupp Manufactures a Complete Line of Tumbling Barrels and De-Burring Machines.

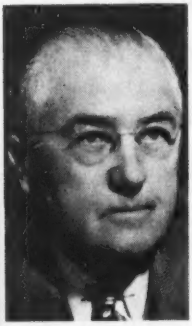


HUPP CORPORATION

GLOBE STAMPING DIVISION

1250 WEST 76th STREET • CLEVELAND 2, OHIO

It has been announced that **RAY SIMPSON**, chairman of the board of the Simpson Electric Company, Chicago, manufacturer of testing and panel instruments for the electronic industry, has been appointed to the position of chairman of the Subpanel on Indicating Instruments, a part of the Panel of Components, (which is a part of the Research and Development Board).



Ray Simpson

The Research and Development Board, with headquarters in Washington, D. C., is comprised of civilian and military personnel for the purpose of regulating and advising on research and development in the electronic industry. One of the major purposes of this group is to coordinate the efforts of military and commercial organizations with scientific achievement, to prevent duplication of effort, and to bring strong interrelations between these groups.

Mr. Simpson's duties will be to preside over all discussions within his group and to keep abreast of all panel and testing instruments development.

The American Cyanamid Co., New York, N. Y., has announced the promotion of **HERBERT G. PRATT** to manager of the San Francisco office of the Indusrial Chemicals Division. At the same time **SHELDON T. DAHL** was named West Coast manager of the company's Industrial Chemicals Division and Plastics and Resins Division.

Both men joined the company when their sales and distribution firm, S. T. Dahl Company, was acquired by Cyanamid in 1948.

JOHN M. MARTIN has been named assistant general manager of the Explosives Department of Hercules Powder Company. For the past four years, he has served as assistant general manager of the company's Cellulose Products Department.

Mr. Martin became associated with Hercules Powder Company in 1934, after graduating from Georgia School of Technology with a B.S. degree in mechanical engineering.

W. WARD JACKSON, formerly sales manager of Celanese Corporation's Chemical Division, has been appointed general manager of the Industrial Chemicals Division of Commercial Solvents Corp., New York City, it has been announced by H. J. Henry, vice president in charge of sales.

W. Ward Jackson

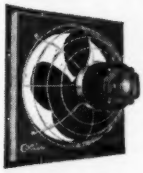
Mr. Jackson was associated with Celanese Corporation for eighteen years in a number of sales and production positions. He has been district manager, director of Product Development, and was sales manager of the Chemical Division for the past five years.

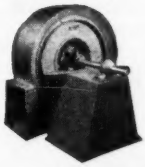
During World War II, he also served in an advisory capacity as special assistant to the vice chairman of the War Production Board and as consultant to its Chemical Bureau, Aircraft Production Board, and Facilities Bureau. He is currently a chemical consultant to the Chemical Division of the National Production Authority.

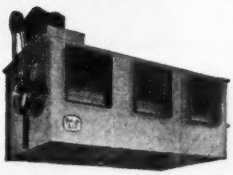
He is a member of the American Chemical Society, Synthetic Organic Manufacturers Association, Society of Plastics Industry, Society of Plastics Engineers, and the A. F. Chemical Association.

A. J. STEFFENS, JR., has been appointed sales engineer for the Osborn Manufacturing Co., Cleveland, Ohio.

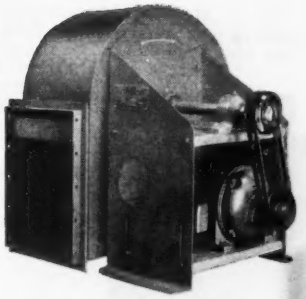
Mr. Steffens, a graduate of Western Reserve University, will cover the North Carolina, eastern Georgia, and Florida territories. He was formerly associated with the National Litho Forms Company and also Remington Rand.







nyb General Purpose FANS



Capacities from 400 CFM to 18,000 CFM.

Portable, self-contained units for Class I industrial and ventilating applications. Recommended for their ease of installation, low maintenance and space saving features. Made in three types and eight basic sizes. Both direct connected and belt driven models.

Laboratory tested, accurately rated and fully guaranteed in strict accordance with Standard Codes.

Write for Bulletin

nyb THE NEW YORK BLOWER COMPANY

SALES OFFICES • 32nd STREET and SHIELDS AVENUE • CHICAGO 16

FACTORY, LAPORTE, INDIANA

T. G. Meulenberg, president of Automotive Rubber Company, Inc., of Detroit, has announced the appointment of **R. A. LEES** as general plant manager with complete responsibility for operation of the company's new rubber mill and all processing departments.

R. A. Lees

A graduate of Oberlin College, Mr. Lees has been closely identified with the anode process of rubber dipping for 22 years. During the war he served as special consultant to the Rubber Bureau of WPB, and more recently to the Rubber Division of NPA. In 1946 he built and later managed the West Coast branch factory of American Anode, Incorporated.

Mr. Lees is a long-time member of the American Chemical Society.

The oppointment of **GEORGE H. GOECKE** as sales engineer for Industrial Ovens, Inc., was announced recently by C. A. Litzler, president.

George H. Goecke

Mr. Goecke will work under the direction of J. K. Gillett, sales manager, and will use the Cleveland headquarters of the company at 13825 Triskett Road as his base of operations. Industrial Ovens designs and builds continuous processing equipment.

A graduate in mechanical engineering from Cornell University, Mr. Goecke was for fifteen years a sales engineer for the Ingersoll-Rand Company. For the last year he has been a manufacturer's representative for the Warren Steam Pump Company of Warren, Massachusetts.

In order to cover more completely the expanding market in the metal cleaner field, Cowles Chemical Co., Cleveland Ohio, has announced that **ROBERT H. CAMPBELL** was appointed to the Metal Cleaner Department in its new sales territory comprising southern Illinois and St. Louis, Missouri.

Robert H. Campbell

Mr. Campbell attended the University of Illinois and Rockford College, specializing in chemistry. Following college he worked for a number of years at National Lock Company, first in the plating laboratory and then as assistant foreman on the plating line.

R. W. BREIDENBACH, formerly of the Company's Los Angeles office, has been appointed San Francisco district manager for the Industrial Chemicals Division of Commercial Solvents Corporation. In this newly-created position, he will report to E. W. Bacigalupi, Western regional manager.

R. W. Breidenbach

A graduate of Loyola University, Mr. Breidenbach was chemical research engineer and chemist in charge of research and control before joining Commercial Solvents in 1948.

Since January 1950, Mr. Breidenbach has been chairman of the Radio Publicity Committee for the Southern California Section of the American Chemical Society and broadcasts the Science Reporter, a weekly educational science program, over the Mutual Don Lee Broadcasting System.

He is a member of the American Chemical Society, Institute of Food Technologists, and Paint-Varnish & Lacquer Production Club.

Keep Finishes Bright

with the protection of Unichrome

CLEAR Enamels

Despite shortages and restrictions, you can still do *high quality* bright finishing. Unichrome Clear Synthetic Coatings developed especially for eye-appealing protection of metals can provide the extra corrosion resistance required for quality finishing.

As you can see from the clipping, for example, Unichrome Coating B-165 on the interior brass plate of a widely known refrigerator has proved to be the most effective protection against humidity, discoloration and corrosion.

United Chromium can also help you on bright finishing *systems*. For example, Unichrome Coating B-115 applied to a Unichrome Clear Dip finish on zinc provides excellent corrosion resistance and an appearance similar to chromium. B-115 also provides extra resistance to corrosion when applied to chromium deposited over thin nickel or no nickel at all.

Remember, in United Chromium you have the Company that knows *metal* finishes as well as their requirements in *coatings*. It will pay you to consult us about *your* finishing problem.

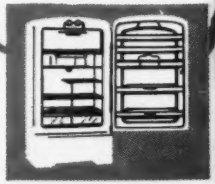
...rmal cleaning.

To protect the bright brass plate, a clear baking lacquer is applied. Many months of experiment were devoted to the problem of a suitable protective coating until one was discovered which is capable of withstanding ... per-...ance tests.

The clear coating, a recently developed product of United Chromium, Inc., has displayed service life in excess of the most severe specifications.

Exposed to a 100 per... rel-ative ... 10F, the coating has held up in excess of 1000 hours without any sign of deterioration of the protective film.

From article in April 1951 issue of Die Castings



UNICHROME Trade Mark

COATINGS for METALS

METALLIC • ORGANIC • PROTECTIVE • DECORATIVE

Products of UNITED CHROMIUM, INCORPORATED, 100 E. 42nd St., New York 17, N. Y.

Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Cal.

In Canada: United Chromium Limited, Toronto, Ont.

NECROLOGY

The death of **WILLIAM E. HERB,** vice president and general sales manager of the Gifford-Wood Company, occurred suddenly Tuesday, July 3.

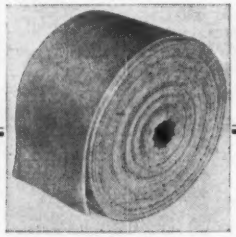
A graduate of Lafayette College, Mr. Herb had been associated with Gifford-Wood since July 1916.

HONORS

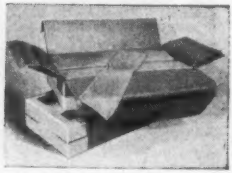
The board of directors of The Electrochemical Society have announced that the first Palladium Medal Award will be presented to **DR. CARL WAGNER,** Visiting Professor of Metallurgy, Massachusetts Institute of Technology. The Palladium Medal was established in 1950 by the Corrosion Division of the Society for outstanding contributions to corrosion and to fundamental electrochemistry. The award is made possible by royalties received by the Society from sales of the "Corrosion Handbook."

Dr. Wagner will receive the Palladium Medal at the fall meeting of the Society, to be held October 9-12, at the Statler Hotel in Detroit. At that time, he will present the Medal Award Lecture covering some phases of his researches of general interest.

Dr. Wagner is recognized internationally for his outstanding contributions to the theory of oxidation and tarnish of metals. He showed through papers first appearing in the early 1930's that oxidation of a metal is not a direct chemical reaction as was once supposed. The mechanism, instead, can be interpreted by electrochemical processes. For instance, positively charged metal ions and electrons may diffuse outward through the oxide to unite with oxygen at the oxide-gas interface. By measurements of transference numbers, conductivities of reaction-product layers and free energies of reaction, Dr. Wagner was able to calculate the oxidation rates for copper and the tarnish rates for silver which were in very close agreement with observed data. His theory was probably the most important advance to corrosion science since the proposal of the electrochemical theory of corrosion in aqueous media.



IN ROLLS
Cut off any size piece and use as needed.



CUT BULK
Already cut and folded, ready to use.

NOW! Tack Cloth in Handy Rolls or Cut Bulk

Now you can get Tack Cloth packed the way it's easiest for you to use—either in 150 yard rolls of 36" wide cloth or in handy cartons—100 or more Tack Cloths to the carton.

No matter which way you buy it, you can be sure that every square inch will *stay* SOFT and TACKY until the very last bit is used up.

The Cut Bulk size is 18" x 36"—folded to 4½" x 18" for easy handling. *All of our Tack Cloth is Spontaneous Combustion-Proof, Lint-Free and Wax-Free.* It's clean and sanitary—*there's no waste.*

Write today for complete information, prices and samples.

BAUGHN CHEMICAL PRODUCTS CO.

The Tacky Wiper Specialists

7019 N. Ravenswood **Chicago 26, Ill.**

Also Individually Packed in Glassine Envelopes — 144 to the Carton

— A WARRANTY OF SATISFACTION IN EVERY CARTON —

"THEM REVENOORS SHORE BEEN NICE SINCE PAW CONVERTED TO PAINT THINNER FOR THEM *VEDOC* BOYS"

It wasn't so long ago that the raw material situation was just about this tough. But during that period of shortages, there was no change in the high quality of DEFENSE PAINT that came from Ferro's shipping docks.

Whether your orders were for gallons or drums, the formulation that made up your particular order never varied. You still got the best possible government specification finish, for your particular finishing operation.

When you bid on Defense Orders calling for specification finishes, remember the experience and production facilities that Ferro can offer, to make your finishing job the most efficient part of your production line.

FERRO CORPORATION

LIQUID PLASTICS DIVISION

4150 East 56th Street • Cleveland 5, Ohio

Vedoc

SOCIETIES

Initial plans for the Third Industrial Finishing Exposition sponsored by the **AMERICAN ELECTROPLATERS' SOCIETY** were announced at the 38th Annual Convention of the Society, held at Buffalo, New York, July 30-August 2. The 1952 event is scheduled for Chicago's International Amphitheatre and will be conducted simultaneously with the Society's 39th Annual Convention, slated for the Stevens Hotel.

Prompted by growing evidence that the demand for new industrial furnaces needed for heat treatment of aluminum and steel defense items is moving beyond the capacity of the producers of such equipment, the **GOVERNMENT BUSINESS COMMITTEE** of the **PORCELAIN ENAMEL INSTITUTE** has compiled a comprehensive report of defense work possibilities for porcelain enameling furnaces.

According to E. W. Dany, chairman of the sub-committee making the survey, the project was undertaken to assist PEI members in converting their porcelain enameling furnaces to defense work and to suggest specific defense applications. An inventory of available furnaces also was made.

The Committee reports that there are approximately 350 batch type and 250 continuous monorail type enameling furnaces in the U.S.A. All enameling plants also have pickling facilities—a fact the Committee considers to be of equal importance to the furnace in some heat treating operations, removal of scale to prolong die life.

According to the PEI Committee, batch type furnaces could be used for annealing and hardening of various steel products with a minimum of furnace changes. The report outlines the proper conversion procedure as well as additional changes needed for heat treatment of aluminum. Several specific conversion and heat treatment projects accomplished during World War II are described, involving such defense items as armor plate, tank treads and shovel blades.

The PEI report also outlines conversion procedure for continuous monorail type enameling furnaces and describes the actual use of these furnaces for heat treatment of fourteen-foot lengths of armor plate, bombs, and steel cartridge cases. It is pointed out that most porcelain enamel plants have press equipment which could be utilized in the stamping of steel cartridge cases, and that in

Shown looking over exhibit layouts in photo, left to right are: Herberth E. Head, Briggs Mfg. Co., Detroit, Mich., vice chairman of Exposition Committee; Clyde Kelly, B. Mercil & Sons Plating Co., of Chicago, Illinois, Exposition chairman; and Lew Glassner, Glassner & Associates, Chicago, Illinois, Exposition director and promotion manager.

TO ADD

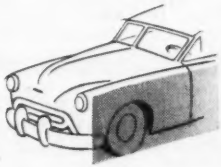
Superior Paint Performance

TO YOUR PRODUCT'S SALES FEATURES . . .

USE

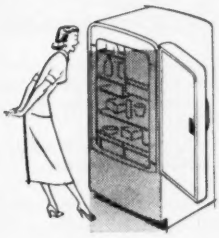
Bonderite

UNDER THE PAINT



Quality products should look the part—on the showroom floor and in service. To guard the good looks of painted metal, leading manufacturers use Bonderite before painting.

Bonderite, Parker's corrosion resistant paint base, converts the metal surface to a nonmetallic phosphate coating, provides a sure anchor for paint and protection for the metal against the formation of rust and corrosion. Bonderite application is positive, quick, easy to control, dependable, low in cost, and effective on products that range from automobiles and trucks to kitchen mixers.



Your painted metal product should have the assurance of superior paint performance that Bonderite brings. Full information is yours on request.

Write for your copy.

Parker Products meet government specifications
Available for your guidance—a list of government finish specifications and the Parker Products which meet their requirements.

Bonderite, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

PARKER — Parker Rust Proof Company

2172 East Milwaukee Avenue, Detroit 11, Michigan

BONDERITE—Corrosion Resistant Paint Base • PARCO COMPOUND—Rust Resistant • PARCO LUBRITE—Wear Resistant for Friction Surfaces

many other cases individual plant facilities will enable production operations in conjunction with heat treating.

The Committee estimates that utilizing only half the furnaces in the porcelain enamel industry for heat treating would result in a daily output of approximately 36,000,000 pounds.

MEETINGS

The **100th MEETING** of **THE ELECTROCHEMICAL SOCIETY** will be held at the Hotel Statler, Detroit, October 9-12, 1951.

The technical program will include symposia on Corrosion, Electrodeposition, and Electro-Organic Chemistry, and round tables on Screen Engineering, Power Supply and Requirements for the Electrochemical Industries, and Primary and Secondary Batteries.

Plant trips are scheduled to the Dow Chemical Company, Midland; the Ford Motor Company's new water filtration and disposal plant at Monroe; and the engineering laboratories of the Chrysler Corporation.

Significant of the increasing interest in the hot spray method of applying organic protective and decorative coatings will be the "Hot Spray Solarium," feature of the **1951 PAINT INDUSTRIES' SHOW** of the **FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS** at Atlantic City, October 31, November 1, 2, and 3 this year.

Producers of raw materials and manufacturers of hot spray equipment have worked out a cooperative display wherein a wide variety of beautifully finished objects will "case history" the broadening markets for this type finish.

Among the companies active in this presentation are: Beck Equipment Company, Bede Products, Inc., Carbide & Carbon Chemicals Corporation, Commercial Solvents Corporation, DeVilbiss Company, Hercules Powder Company, M & E Manufacturing Company, Pol-Flo Paint Sprayer Corporation, and Reliable Products Manufacturing Company.

The Finance and Executive Committees of the **FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS** will meet at the University Club in Pittsburgh, Pa., September 21 and 22, 1951.

Those attending the meeting will be guests at the regular meeting of the Pittsburgh Chapter on Friday evening, September 21.

meetings OF INTEREST TO FINISHERS

Oct. 8-12. 39th National Safety Congress and Exposition, Stevens, Palmer House, Congress, Morrison, and La Salle Hotels, Chicago, Illinois.

Oct. 10-12. Annual Shop Practices Forum, Porcelain Enamel Institute, Ohio State University, Columbus, Ohio.

Oct. 9-12. Fall Conference, The Electrochemical Society, Statler Hotel, Detroit, Michigan.

Oct. 15-19. 33rd Annual Metal Show and National Metal Congress, Detroit, Michigan.

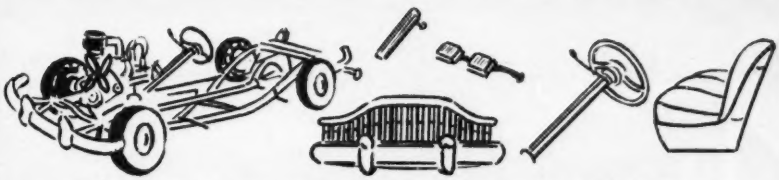
Oct. 18-20. South Central Regional Meeting, National Association of Corrosion Engineers, Corpus Christi, Texas.

Oct. 23-25. 54th Annual Convention, International Association of Electrotypers & Stereotypers, Hotel Kenmore, Boston, Massachusetts.

Oct. 29-31. 63rd Annual Convention, National Paint, Varnish and Lacquer Association, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

Nov. 1-3. 29th Annual Meeting, Federation of Paint and Varnish Production Clubs, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

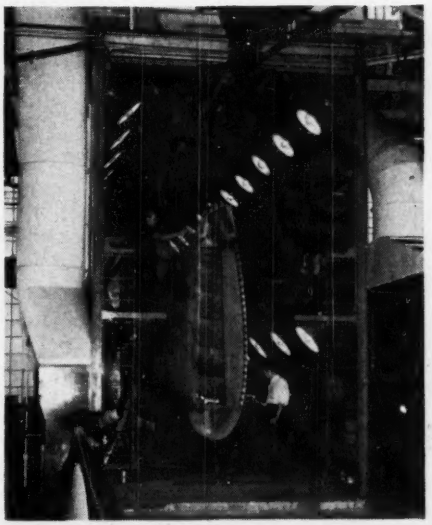
Nov. 26-Dec. 1. 23rd Exposition of Chemical Industries, Grand Central Palace, New York, New York.



YOU WOULDN'T BUY A CAR THIS WAY

. . . So why buy a Finishing System piecemeal ?

LET KOCH DO THE ENTIRE JOB!



The components of your metal finishing system require the same "designed for each other" characteristics as those of a fine car.

It's logical, then, that when you arrange for KOCH to handle your finishing system there's a perfect dovetailing of all production details — from raw materials to the completed installation.

This coordination — as executed by KOCH — assures you a job that's started on schedule, finished on schedule, and with results that keep paying you dividends for years to come. Let KOCH engineers review your problem now.

Phone, Wire or Write Today!

GEORGE KOCH SONS, INC.

EVANSVILLE, INDIANA

BINKS SALES AND SERVICE OFFICES

1 Chicago	7 Dallas		
2 New York	8 Denver	13 Pittsburgh	
3 Detroit	9 Indianapolis	14 St. Louis	
4 Los Angeles	10 Milwaukee	15 San Francisco	
5 Atlanta	11 Nashville	16 Seattle	
6 Cleveland	12 Philadelphia	17 Springfield	

EVERYTHING FOR SPRAY PAINTING

Binks Nationwide Service...

PROTECTION AGAINST COSTLY TIE-UPS!

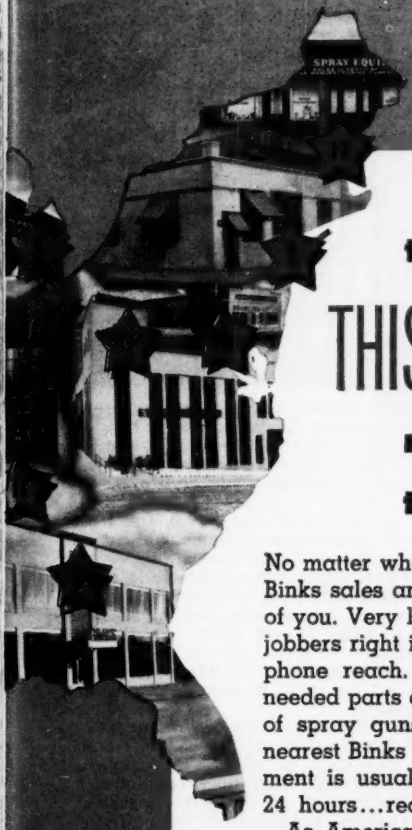
"Field service is of equal importance with product superiority."

Burke B. Rocke President

Binks **MANUFACTURING COMPANY**

3115-19 Carroll Ave., Chicago 12, Ill.

NEW YORK • DETROIT • LOS ANGELES • ATLANTA • BOSTON • CLEVELAND • DALLAS • MILWAUKEE • NASHVILLE
PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO • SEATTLE • WINDSOR, ONTARIO, CANADA



today,

THIS 24-HOUR SERVICE

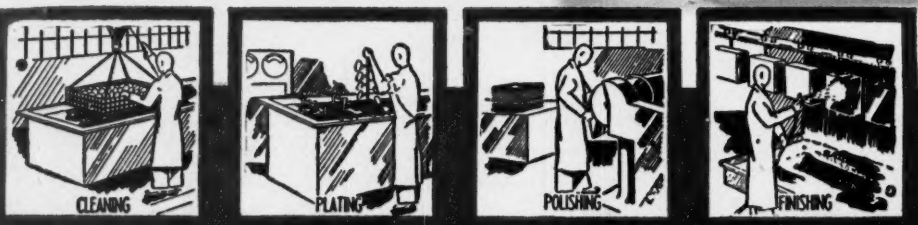
means more than ever

to you

No matter where your plant is located, there is a Binks sales and service office within a few hours of you. Very likely, you'll find one or more Binks jobbers right in your own city...within easy telephone reach. These men are ready to supply needed parts and to help you. Major overhauling of spray guns and equipment is done at your nearest Binks service office. Reconditioned equipment is usually on its way back to you within 24 hours...ready for years of additional use.

As America swings into its giant defense program, the importance of immediate service on spray finishing equipment greatly increases. In "defense plants" finishing departments must be expanded and maintained to keep abreast of stepped-up manufacturing...in all plants equipment must serve longer. In either case Binks Engineering and Service Departments are ready to give you the instant attention you need...whether it's the design and installation of a new finishing department, counsel on the application of new finishes, or a rush repair job.

Send now for full information on the Binks complete line of finishing equipment.



New • EQUIPMENT • MATERIALS • PROCESSES

New Electrostatic Painting Process

A new method of applying enamels, lacquers, varnishes, synthetics, or paints to metal or plastic objects on a mass production basis has been developed by the Ransburg Electro-Coating Corp., 1234 Barth Ave., Indianapolis 7, Indiana.

Known as the Ransburg No. 2 Process, it uses the principles of electrostatic atomization and deposition to deposit a finish with a coating efficiency said to range from 95 to 98 per cent in plants where it is already in use.

The basic unit with which the coating is applied consists of an atomizing head, which is hollow and bell or cone-shaped. A positive displacement pump meters the coating material to the apex of the head through a rubber hose. In this head the material spreads uniformly over the inner surface and flows to the outer edge due to the rotation of the heads.

A high potential of 100,000 volts is applied to the heads from a high potential supplier which operates on the usual industrial voltage of 220 volts, 60 cycle, single phase. Parts that are to be coated are grounded through the conveyor and thus, for all practical purposes, acquires a zero charge.

The atomizing heads are of the universal type and can therefore be used at any angle. Although they may be mounted in any number, it has been found practical to use them either singularly or in series of three. Power transmission to cause the heads to rotate at 250 r.p.m. is from an electric motor through worm gears.

The heads are designed to be applicable to all finishes and are made from 1 to 18 inches in diameter.

The manufacturer claims that there is no overspray, and painting around edges can be accomplished easily. With the elimination of overspray, no paint

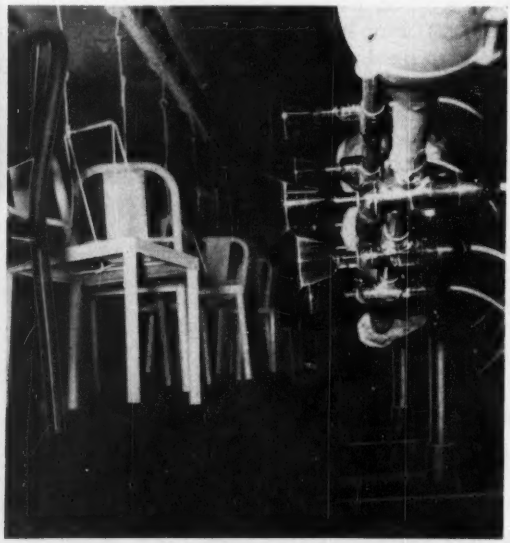


Fig. 1—Close-up of the Ransburg No. 2 Process electrostatic atomizing heads.

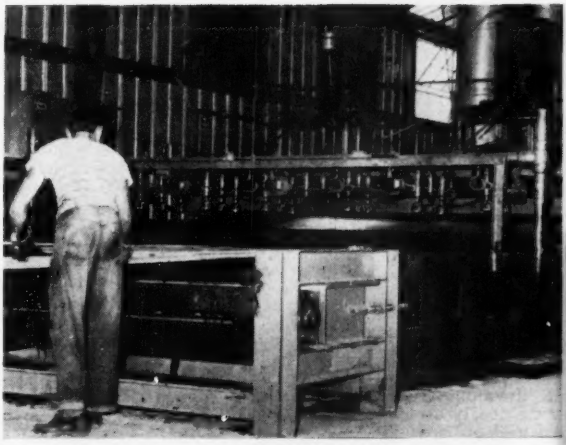


Fig. 3 — Application of the Ransburg No. 2 Process in spray painting roofing and siding.

booths, water curtains, or large air circulation systems are necessary. Fresh and exhaust air requirements can be based solely on the solvent which is used in the coating material.

It is stated that even distribution is achieved by this method. The desired thickness of the coating is controlled by the conveyor speed, speed of the pump, or the number of spray units. Since these spray units can easily be mounted in batteries, there are no limitations as to the size of the products that can be finished by this method.

Tin Plating Thickness Gage

A tin plating thickness gage functioning on the principle of absorption of X-rays by plated coatings has been announced by the North American Philips Co., 750 South Fulton Ave., Mount Vernon, New York.

Because X-rays and Geiger-Counter tubes are used for testing, the gage allows continuous process control, is very fast, and makes the tests non-destructive.

Units are available for checking plating on one side of a sheet at a time or both sides simultaneously. Thicknesses ranging from 10 micro-inches to 120 micro-inches can be determined to within two per cent and the overall sensitivity is such that coatings as thin as 1 micro-inch are detectable. Coatings in excess of 120 micro-inches can also be gaged but with somewhat less precision.

Due to the diversity of sheet sizes and the necessity for allowing different forms of indexing, the design of the bench or table on which the sheet is to be gaged is left to the individual user.

The dual apparatus stands 5 ft. high and requires a floor space of 7½ by 6½ feet exclusive of any indexing equipment which might be employed. The single unit is smaller in overall length but has the same height and width.

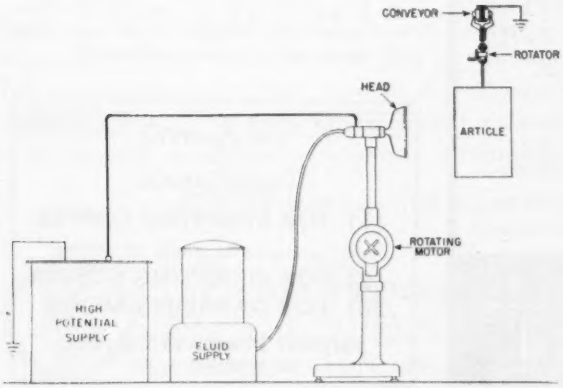


Fig. 2—Component parts of the electrostatic process of applying finishes.

For more complete information on products and processes use READER SERVICE CARDS inside covers.

These gages are self-contained and are designed for operating on 200-240 volts, single phase, 60 cycles, with a consumption of 3 Kva for the single unit and 5 Kva for the large unit. Maximum cooling water requirements do not exceed 4 quarts per minute.

White Brass Alloy

A development that may help replace strategically short nickel in the automotive and other industries was announced by the Electrochemicals Department of E. I. du Pont de Nemours & Company.

Through it, a "white brass" alloy is used to replace nickel as a base for chromium finish. This process is now the subject of intensive research work in the company's laboratories and in manufacturers' plants but it is emphasized that there are still a number of technical obstacles to be overcome.

In making bright decorative metal parts it is customary to plate chromium over deposits of copper or combinations of copper and nickel. However, industry has been severely restricted in its use of nickel by the government and the white brass alloy development promises to help alleviate this problem by providing an acceptable replacement.

Preliminary results indicate that chromium, plated over white brass, is indistinguishable in brightness and color from that plated on a nickel base. The white brass used in this process is an 80/20 zinc-copper alloy which is electrodeposited from a cyanide bath using special brightening agents. From there on articles are chromium plated in the usual manner.

Control for Special Uses

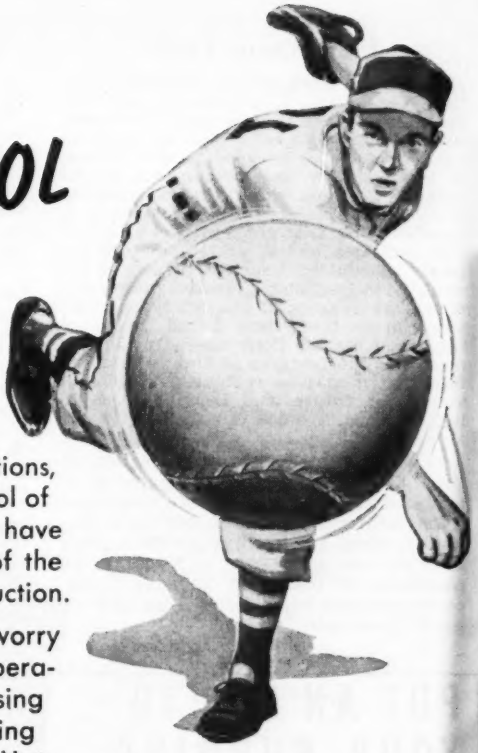
An instrument, combining the advantages of pneumatic control and having a full 120-foot-long, 11-inch calibrated width chart, has been developed by the Brown Instruments Division of the Minneapolis-Honeywell Regulator Company.

The new instrument is an electronic potentiometer that has a 1 per cent proportional band, a 150 per cent proportional band and manual reset, or a 150 per cent proportional band and automatic reset.

It is applicable to all industries where the larger and longer chart combined with pneumatic control is desired.

McKeon's
"Liquid Sulphur"
(1) FOR STRIPPING COPPER
Safe, no current required, no etching.
(2) FOR OXIDIZING COPPER
(3) FOR OXIDIZING SILVER
Sulphur Products Co., Inc.
GREENSBURG 8, PA.

PERFECT CONTROL



● Ask any big-league pitcher about control. He'll tell you it is mighty important in winning ball games.

And in finishing room operations, control is important, too. Control of paint temperature and viscosity have much to do with the quality of the finish, and the volume of production.

No longer do you have to worry about daily and seasonal temperature fluctuations. No more fussing with solvents and retarders trying to meet changing conditions. Hot spray with the Bede Paint Heater is the perfect answer . . . assuring uniform, consistent results.

Bede Paint Heaters give you thermostatically controlled heat at the exact temperature best suited for the job and materials. With Bede Heaters you get finest quality results—fewer coats are required—waste, due to overspray is reduced—rejects are cut to a minimum—and volume production is increased. Investigate the many advantages today!

WRITE OR WIRE FOR ILLUSTRATED BULLETINS

BEDE PRODUCTS Inc.

INDUSTRIAL FINISHING SPECIALTIES

4311-A RIDGE ROAD • CLEVELAND 9, OHIO

Enley Drum Liner

The Enley Products Co., 254 Pearl St., New York 7, N. Y., produces a polyethylene drum liner that is now electrically sealed. In order to save waste of products between folds or creases in the bottom of liners, Enley has developed a round contoured bottom which eliminates waste. A new principle recently developed is a double bottom that gives greater strength and provides extra protection against tears. Chemical manufacturers, dye works, electroplaters, electrotypers, and many other users of the Enley polyethylene drum liner have found this liner indispensable for their uses. One of the most flexible features of the liner is the fact that it may be removed, folded and stored for future use. Loss of valuable liquid is also avoided due to this removable feature.

The chemical resistant properties of these liners are said to be exceptional. It is stated that they will remain flexible at temperatures as low as 40 degrees F. below freezing, and as high as 185 degrees F. They are not sticky, and contain no plasticizer to bleed out, and are chemically resistant to acids, alkalies and organic chemicals.

PUT AN END TO YOUR BURRING PROBLEMS

with

PURICO "PUR-BUR"

PUR-BUR, new self-lubricating compound swiftly removes burrs, gouges, minute cracks —yet retains accurate finishes. Lasts longer, is more economical than ordinary polishing wheel. Available in cake and tube form.

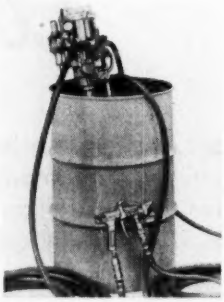
WRITE TODAY FOR COMPLETE INFORMATION

THE PURITAN MFG. CO.

WATERBURY, CONN.

Heavy Mastic Hi-Vol Spray Pump

A new pump, the Shelburne Hi-Vol, designed specifically for speedier handling of materials from heavy mastics to enamels and lacquers, has been announced by the A. Shelburne Co., 739 Ceres Avenue, Los Angeles, Calif., manufacturer of heavy material spray equipment.



Hi-Vol Spray Pump

Engineered to requirements, the pump gives faster delivery by double acting pistons which force material through the lines on both the up and down stroke of the air motor. Therefore production qualities of heaviest and lightest materials are assured with a steady, even flow and its 9 to 1 ratio permits spraying of material to greater heights.

The Hi-Vol is said to be lightweight, easy to handle and save time by pumping directly from material drum. Control of the pump is automatic by the exclusive Shelburne Model 5 Steady Flow Valve which shuts off the pump and relieves all pressure when gun is not in operation. The Hi-Vol is also available with agitator, oiler and pressure regulator for use on a five-gun circulating system.

Chemical Solvents

Announcement comes from the Curran Ordnance Chemical Laboratory, Lawrence, Mass., of a synergistic solvent possessing high grease cleaning and carbon removing properties for the purpose of cleaning metal parts. The new product is described as a novel di-phase solvent and comprises a water emulsion floating top layer sealing a volatile chlor-aromatic solvent lower layer. High synergism is said to result from the combined action of the detergency of the two layers against water soluble and oil soluble dirt respectively.

Laudable

Some of our customers make their product of awe-inspiring beauty. Others make tools that undergo terrific abuse. However, these customers have one thing in common. They have the advantage of using individualistic coatings prepared to their specifications along with the know-how in our Creative Studio.

For a finish that will win praise for your product, permit us to formulate a sample for you.

No obligation, of course.

No Tampering with Quality

ROCKFORD VARNISH *Company*

ROCKFORD, ILLINOIS

Manufacturers of Protective and Decorative Coatings

Affiliate

GORDON BARTELS CO.

Roller Coating Specialists

It is stated that this di-phase solvent is substantially faster and will produce more complete and quicker results than can be obtained from present chlorinated type vapor degreasing solvents. Also, where chlorinated solvents can no longer be obtained because of critical shortages, the di-phase solvent may be used as a replacement in the present solvent distilling cleaning tanks with generally superior cleaning resulting from the new liquid phase cold immersion method, it is claimed.

Safety to personnel characteristics of the di-phase solvent are said to be high since its top water-emulsion seal prevents direct contact with skin, and it is therefore also fireproof. In addition both phases are completely water soluble and in event of a sprinkler protected building, the solvent will simply rinse away as a solution of liquid soap.

Automatic Spray Painting Machine

A two-station, two-color unit for use with standard type spray masks has been announced by Sepanski and Associates, 412 Henry Ave., S. E., Grand Rapids, Mich. Mechanically automatic applications of paint finishes as decorative designs to metal stampings, die castings, and similar products at production line speed are the functions of this machine.

Work to be painted is pressed against the spray mask, which is semi-permanently installed in the spray opening. The operator then presses a foot valve that activates the spray cycle. One or two operators, as production dictates, may be used with the machine.

Within the unit, pneumatic power moves two automatic spray guns parallel to the surface being painted to apply an even coating. Adjustable to any desired spray density, these guns can be set to any angle from 0 to approximately 30 degrees in any direction, and can be regulated to automatically alter the angle of application during transit to assure an even distribution of paint to flat and recessed or raised portions of the surface and to sides and corners of depressions and around mask bridges without shadowing.

Advantages claimed for this machine over manual spray painting include uniformity in quality and speed of production (from 100 to 300 per cent more than hand spraying), elimination of spray booths and cumbersome clamping and holding devices, less floor space required, and the fact that much smaller spray masks can be used since it is not necessary to block off areas other than that immediately surrounding the portion that receives the paint.

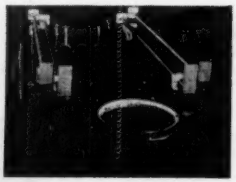
Except for a suitable exhaust duct, air line connection and paint supply, the unit is entirely self-contained and all spray and fumes are confined within the machine.

There are three sizes available in the two-station units, providing spray areas for each station 12, 18, or 24 inches long and 6 inches wide. Standard single-station units are available in the same length and width—12, 18, and 24 inches, and special two or single-station units for greater length and width are made.

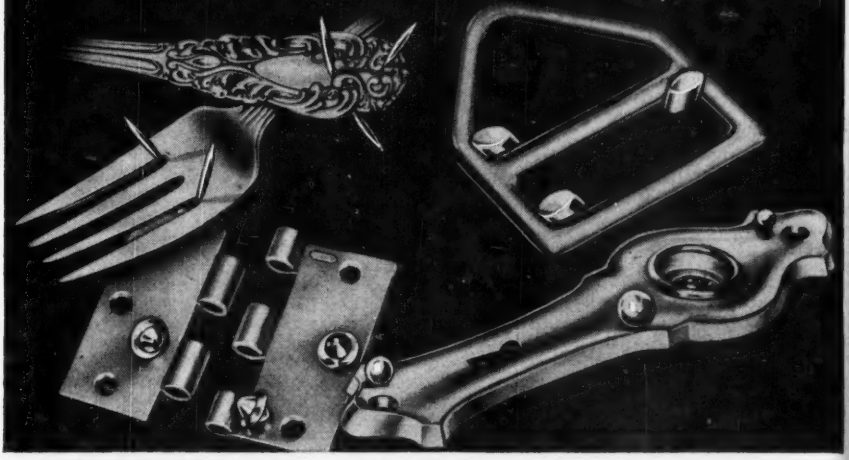
Improved Tumbling Compound for Ferrous Metals

Tumb-L-Matic, Inc., 4510 Bullard Ave., New York 70, N. Y., has announced an improved wet-process tumbling compound as an addition to the line of tumbling

Write for Catalog of
PAINT TESTING APPARATUS
GARDNER LABORATORY
Bethesda 14, Md.


● Lined PROCESS TANKS
● Acid-Proof HEATING UNITS
"Investigate Our Complete Facilities"
HEIL PROCESS EQUIP. CORP.
12901 Elmwood Ave., Clevel'd 11, O.

in BURNISHING MATERIALS



it's the SHAPE that counts!

Thousands of small parts, stampings and castings are burnished quickly and efficiently with Abbott Burnishing materials. They're shaped to do the job *right!*

Abbott Burnishing Shapes — Ball, Ovalball, Cone, Diagonal, Pin — are scientifically designed to make effective contact on parts of of any size and shape. Each is made from Abbott's famed bearing ball steel, deep hardened and polished to a mirrorlike, glass hard finish.

If you have a burnishing problem . . . make use of Abbott's 40 years of barrel finishing knowledge. Write today.

THE ABBOTT BALL COMPANY
1064 New Britain Ave.
Hartford 10, Conn., U.S.A.

ABBOTT
the all round ball

Decorating Masks

equipment, compounds and techniques that comprise Tumb-L-Matic processes for metal finishing. The special properties of this formulation are attributed by the manufacturer to the greater abrasive action of the media because of the chemical cleaning action of Tumb-L-Magic. The cleaner acts to suspend grease and cuttings in the solution, thus keeping work surfaces and abrasive media free of action-retarding accumulations. Use of Tumb-L-Magic in conventional tumbling equipment is said to result in a faster, higher finish than was formerly obtainable.

Decorating Masks

Increased production with controlled fidelity of marking is now possible with masks for decorating and identifying products requiring simple or elaborate color schemes. Manufactured by the Jas. H. Matthews Co., 3918 Forbes St., Pittsburgh 13, Pa., the spray mask is a shell-like mold which fits snugly over an object to be colored. The surface of the object to remain protected is covered by the mask, while cavities in the mask permit color to be applied on the desired parts. Unskilled workers can easily spray any color pattern on an object with perfect results and with minimum fatigue, yet the rate of production is increased over other methods of decorating.

These masks are said to ensure uniform coloring that guarantees the fidelity of a product's appearance from the first to the last off the assembly line. Made of non-corrosive materials, the masks, under normal care, will last indefinitely. Each mask is electrocasted to conform to every contour of a product, regardless of its size or shape.

The masks are constructed by bridging, a method by which an "island" or small pattern is suspended from the main body of the masks by thin wires or rods, and baffling, where one or more partitions or "splash guards" are erected which allow the spraying of many colors on an object with a single mask.

To permit easy insertion of a product into the mask, backing-out, or the building up of any portion of the mask in the electrocasting process, may be used. Backing-out is also necessary in multi-color spraying so the contact surface of the mask will not touch "wet paint" areas.

Lead-Covered Copper Heating Coils

Knapp Mills, Inc., 121 Broad St., New York 4, N. Y., has announced a line of lead-coated copper coils for heating or cooling highly corrosive acid solutions.

These coils are claimed to provide long uninterrupted service life under severe corrosive conditions. The inner copper lining eliminates any corrosion by the steam, yet gives good heat transfer to the outer lead sheating. These coils may be used up to 150 p.s.i. pressures. The regular lead coating thickness over the copper tubing is $\frac{3}{32}$ to $\frac{1}{2}$ inch.

For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

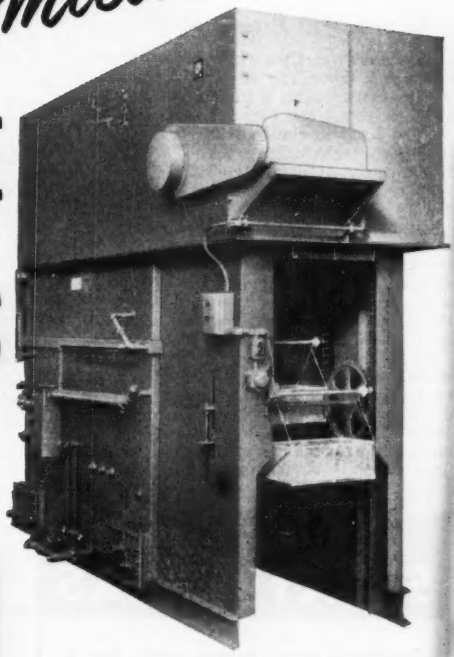
Economical

BLAKESLEE

SOLVENT VAPOR

DEGREASERS

USE LESS SOLVENT



BLACOSOLV

Stabilized Degreasing Solvent — one price, one solvent *for all metals*

NIAGARA

Metal Parts Washers for use with cleaning compounds on either batch or production jobs.

Blakeslee Solvent Vapor Degreasers USE LESS SOLVENT because of the patented construction and operational features. Metal parts are made chemically clean and dry in just a few seconds. Save time, labor, rejects with a Blakeslee Solvent Vapor Degreaser. A Blakeslee engineer-trained representative is available to solve your specific degreasing problems.

G. S. BLAKESLEE & CO.

1844 S. 52nd Avenue • Chicago 50, Illinois

New York, N. Y. Toronto, Ont.

For more complete information on products and processes use READER SERVICE CARDS inside covers.

Super-Mul Emulsion Cleaner

The DuBois Co., Industrial Div., Cincinnati 3, Ohio, has announced its ready-to-use Super-Mul, a high strength, active solvent emulsion cleaner specifically designed for the removal of industrial soils in spray washing machines. It cleans thoroughly, rinses freely, resists hard water, and does not sludge out even with heavy soil loads.

Super-Mul is not only effective, but it is also safe, both on personnel and materials, the company claims. It does not attack metals and painted surfaces and will not deteriorate machinery or equipment. It is free of objectionable odor, is non-toxic, and has a high flash point.

Super-Mul is highly recommended for metal cleaning in one-stage washers, for cleaning prior to Bonderizing, cleaning during processing, and before painting. When used in low concentrations in the rinse, it provides interim rust-inhibiting. The cleaner is also useful for precleaning prior to alkaline cleaning and for wipe-down cleaning of equipment, and so on.

Thinner Formulation Service

Users of thinners may now obtain blended solvents made to their own particular requirements, the Potter Paint Co., Inc., Cortland, N. Y., has announced. This special service is on a nationwide basis.

For over twenty-five years, this company has specialized in thinner formulation service on a direct-by-mail plan. The wide experience gained in meeting customer specifications makes it possible for this company to extend their program for the industry generally, according to R. I. Potter, president. In announcing the expanded formulation service, it was emphasized, that the company makes nothing but thinners and blended solvents. Orders are not filled out of a stock tank; every drum of thinner is made specifically for an individual customer.

3M Corrosion Preventive

A transparent coating for polished and plated metals—a coating that protects against tarnishing, but "shows off" the luster of the metal—has been announced by the Adhesives and Coatings Division of Minnesota Mining and Manufacturing

NICKEL
SPRAY MASKS

DURABLE nickel formed masks last 2 to 3 times longer and give 100% to 300% more parts finished than conventional copper masks before reservicing. No other mask equals their performance and long life.

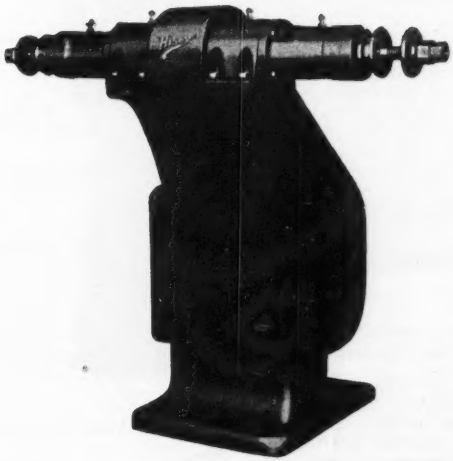
For complete details write for our free brochure No. PF-10 or send samples or prints for quotations.

Thierica Studio
409 Henry Ave., S. E.
Grand Rapids 6, Mich.

PAINT MIXER

MIRACLE
5 GALLON
PAINT REJUVENATOR
All paint restored to original consistency without opening the can.
2 minutes per gallon.
MIRACLE PAINT REJUVENATOR CO.
128 E. 10th St., St. Paul 1

The right START



to the best FINISH!

To obtain the best finish on your final polished product, it is necessary to start with good equipment. The wheel must operate at proper speed and without vibration.

HISEY Buffing and Polishing Machines are designed and constructed to do just that and much more. Operator has plenty of foot room and freedom of operation about the wheels to produce quickly with a minimum of effort.

All moving parts subject to wear are made with liberal reserve capacity and of materials scientifically selected.

All the above added together equals quality product, maximum production, low labor cost and minimum maintenance.
HISEY Buffing and Polishing Machines are made in a wide range of types and sizes from ¼ H.P. bench mounted to 50 H.P. capacity.

DUST COLLECTING EQUIPMENT ALSO AVAILABLE

Hisey THE HISEY-WOLF MACHINE CO.
CINCINNATI 8, OHIO
Division of The Cincinnati Electrical Tool Co.

CATALOG 71 PK FREE ON REQUEST

Co., 411 Piquette Ave., Detroit 2, Mich.

The coating is expected to be used primarily on stainless steel, chrome, plate and polished aluminum, both on finished products and on already-installed metal units in plants. It is not intended for copper, zinc, or their alloys.

The resin-base material was originally developed for application to automobile bumpers, grilles, and brightwork because of its resistance to weathering, shock, and abrasion, it was stated. It is now being released in brushable or sprayable forms for general industrial use.

Neox-Coated Rubber Gloves

A new type of rubber glove coated with Neox is offered by the Hanson-Van Winkle-Munning Co., Matawan, N. J., for plating room use, with the following advantages:

The Neox coating is chemically welded to strong fabric. Seams are tight and safe against harmful fluids; Neox-coated gloves give longer service on toughest jobs; thumb-span pattern. The wider, curved thumb span allows freer thumb and finger action; no binding or patch reinforcement needed. The gloves have a long palm and good fit, with free hand action throughout in both knit-wrist and gauntlet styles; curved fingers, made by a special molding process, provide normal hand shape, greater flexibility, freer action, and better grip; they are light and rugged, and have been laboratory tested and approved for plating applications.

Neox-Coated Rubber Gloves

Rust-Preventive Wrapper for Heavy Products

Development of a heavy-duty packaging paper, treated with a volatile type

Looking for a Better Finish?

Try

HARRISON'S

4A

TAILOR-MADE BUFFING & POLISHING COMPOUNDS

for

Aluminum, Brass, Copper, Stainless Steel, Carbon Steel, Etc.

EMERY CAKE, GREASE STICK

CEMENT AND THINNER
for setting up wheels, belts, and rolls

HARRISON & COMPANY, INC.
Haverhill, Massachusetts

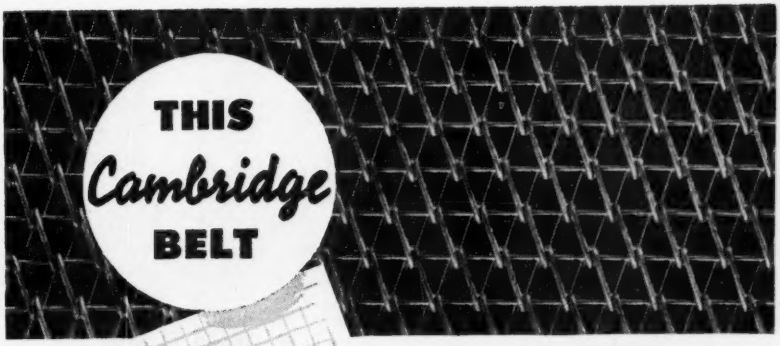
GOLD PLATING SOLUTIONS

In All Colors

Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test
Write or call our experts about your plating problems

Davis-K-Products Co.

54 West 22nd St., New York 10, N. Y.
Oregon 5-0094
5-0095



. . . in brazing, galvanizing, annealing, tempering or other high temperature installations. *Rod-Reinforced* construction means highest tensile strength, low thermal capacity, straight belt travel. Open mesh allows free heat circulation or drainage of process solutions.

Regardless of your specific process, there is a Cambridge woven wire conveyor belt to combine movement with processing of parts or materials.

Woven from any metal or alloy to the mesh or weave that best suits your operating conditions . . . heat, cold or corrosive agents . . . Cambridge belts are constructed to rigid specifications based on our experience in your industry. And any Cambridge belt can be equipped with special drive connections, retaining selvages, cleats, or other attachments for your particular process.

FREE CATALOG. Basic reference manual on conveyor design, belt construction and metallurgy. Write today or call your nearest Cambridge office. See "Belting—Mechanical" in your Classified Telephone Directory.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department A
Cambridge 9,
Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

rust inhibitor has been announced by George A. Daubert, president of the Nox-Rust Chemical Corp., 2429 S. Halsted St., Chicago 8, Illinois.

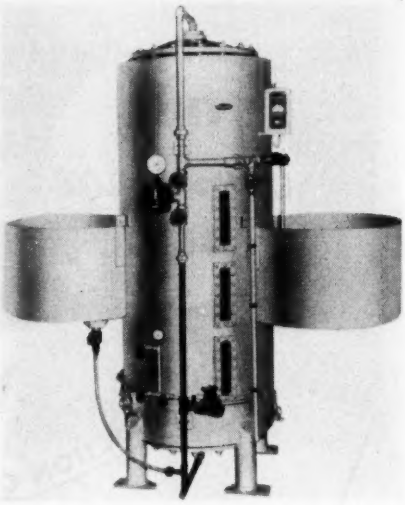
The new product was developed for protection of heavy machinery and bulky metal parts during storage and shipping. The paper, called Vapor Wrapper, is tough, resilient, tear-resistant, and moisture and water repellent. It is made of two high-strength kraft sheets, cemented together, and reinforced with spun glass fibers.

Identified as Nox-Rust No. 120 Glas-Kraft grade, the paper is made of an inner ply of kraft paper which is impregnated with Callex, a volatile rust-inhibitor chemical. When a metal product is wrapped or shrouded with the wrapper, a vapor is released which prevents rust from forming.

Mono-Bed Demineralizer

The Penfield Manufacturing Company, Inc., 19 High School Ave., Meriden, Conn., has announced the availability of a Mono-Bed Demineralizing Unit.

As shown in the accompanying picture, the Mono-Bed Demineralizer operates upon the most efficient and effective deionizing technique available to industry. Cation and exceptionally strong base anion exchangers are intimately mixed in a single unit tank, thus providing in one container the equivalent of a large number of "multiple bed systems." The raw water passes through this Mono-Bed column only once, yet comes out with a mineral content of virtually zero (resistances have been reported as high as 20,000,000 ohms per centimeter).



Mono-Bed Demineralizer

These demineralizers are stated to be ideal for a large variety of industrial operations, including power plants, mirror plating, electronic and anode tubes, photographic finishing, and wherever exceptionally high purity, completely mineral-free water is required. Models are available in flow rates ranging from a few gallons per hour to 5,000 g.p.h. and up.

Conductive Silver Paint

Metalplast Process, Inc., 9-17 37th Ave., Long Island City 1, N. Y., is offering its Conductive Silver Paint which, when applied to a variety of materials, provides a surface that will conduct electricity.

Applicable by hand painting, screen printing, or by spraying to any desired

PLATERS RESEARCH
Control Systems
FOR THE ANALYSES OF PLATING SOLUTIONS
STANDARD ANALYTICAL REAGENTS
PLATERS RESEARCH CORP.
59 EAST 4th STREET NEW YORK 3 N. Y.

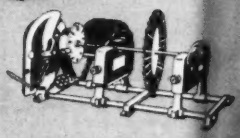
Send NOW for this FIT-ALL
DRUM PLUG WRENCH
Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!

THOUSANDS IN USE saving time, labor, accidents!
SATISFACTION GUARANTEED.... $3.00
Non-sparking type $4.60
Plus Parcel Post
MORSE MFG. CO., Inc.
125 Dickerson, Syracuse 2, N.Y.

NOW... *The most adaptable Grinding and Polishing support ever made . . .*

EACH SECTION BALANCED INDIVIDUALLY

Make big wheels from little ones or vice versa. Replace worn end sections on a wheel in use. With a supply of these sections you can always make up the wheel you need with a minimum of investment in money and space. And now with individually balanced sections you can be sure that your assembled wheel will always be perfectly in balance.

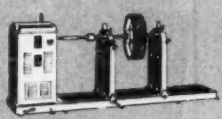


Remember that COSMOWHEELS R52 (for polishing) and R51 (the more aggressive type) are available in durometer hardnesses from 15 to 90. Whatever your grinding and polishing problem, they can do the job as you never thought possible.

The R50 Wheel

Still a standby and a standard in grinding supports, the R50 is unequaled for rough grinding and many other operations. They too, are dynamically balanced for operating speeds as high as 3000 RPM.

Our engineering staff has unequaled experience in every sort of grinding and polishing procedure. That experience is at your disposal. Just write.



"IT'S THE WHEEL THAT DOES THE WORK"

CHICAGO RUBBER COMPANY, INC.

Main Office & Factory
2620 N. Clybourn Ave. Chicago
Makers of the COSMOWHEEL

For more complete information on products and processes use READER SERVICE CARDS inside covers.

configuration or layout, the Conductive Silver Paint air dries in a short time and is as simple to apply as any lacquer.

Metaplast Process, Inc., also offers a custom service of applying metals to non-conductors by many methods, such as electroplating, vacuum metalization, chemical deposition, and so on.

Carbon Heating Equipment

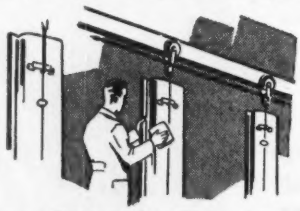
Of interest to manufacturers having problems with corrosive materials is equipment manufactured from an entirely new material of construction. According to the distributor, Parlam Corp., 336 Canal St., New York 13, N. Y., the basis for the equipment is a unique carbon and graphite material, said to be superior in many ways to that heretofore available. It is remarkably strong and corrosion-resistant, with exceptional properties of refractoriness and controllable thermal conductivity.

Available equipment includes coolers, heat exchangers, evaporators, boilers, scrubbing towers, tower-packing, tank linings and tiles, fume ducts, and so on. Pumps and ejectors are now being developed.

Because of newly perfected manufacturing techniques, the carbon material can be used to an extent impossible with carbon produced in the former manner, it is claimed. Patented engineering designs taking advantage of the unique characteristics of the material will prove of unusual interest to engineers and production men, according to the firm.

DUST-ALL Tack Rag

for better, cleaner finished jobs



Remove the specks, lint, dust from surfaces to be painted; wipe them off with a Dust-All Tack Rag; be sure of fine, blemish-free, finished jobs.

Get the Dust-All Tack Rag in the familiar Red Checkered Bag; also available in 150-250-500 yard rolls.

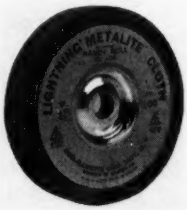
HARDING Manufacturing Co.

10634 GRATIOT AVE.
DETROIT 13, MICH.

Packaging of Abrasive Cloth Redesigned

Behr-Manning, Dept. PF, Troy, N. Y., has redesigned its packaging of Lightning Metalite Cloth "Handy Rolls." This cloth is an aluminum oxide coated abrasive designed for use on all ferrous and non-ferrous metals. In popular strip form of 1, 1½, and 2-inch widths, it is packaged in rolls of 50-yard lengths and in grits ranging from 24 (very coarse) to 500 (very fine).

In redesigning the packaging of this product, the old type wood core has been replaced with a non-allocated metal cup core. A standard size arbor hole of ⅞ inch has been adopted which allows for accurate alignment in rack storage of multiple rolls. The sturdy chipboard side wall protectors have been enlarged in size (in relationship to the roll of coated abrasive material), thus reducing the chance of damage to the edges of the coated abrasive coiled strip. Product identification and specification information are easily discernible through the use of large block lettering in dark brown on buff background printed on the chipboard side wall protectors.



Behr-Manning Lightning Metalite Cloth "Handy Roll"

ENGINEERED PHILLIPS SERVICE

PHILLIPS PRODUCTION DEGREASING BULLETIN

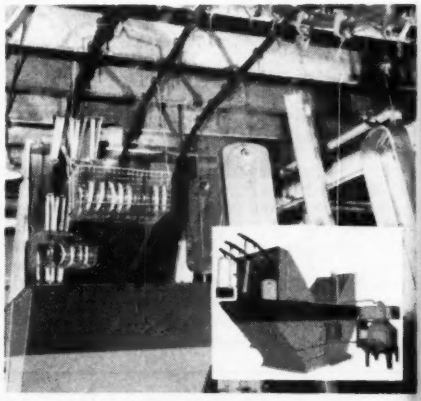
PRODUCTION LINE DEGREASER SAVES OVER 50 MAN-HOURS PER DAY!

Steger Products Builds Phillips Monorail Conveyor Type Unit Right Into Production Line

Steger Products Manufacturing Company saw the need for integrating fast, efficient degreasing with their complete production line. So in place of hand dipping in liquid solvent, (a slow, costly degreasing process) they now use a fast, efficient Phillips monorail conveyor type degreaser. All parts for the various products produced enter the degreaser on three separate monorail conveyor lines and emerge completely cleaned *without being handled by any worker*. Steger estimates that this automatic degreasing saves over 50 man-hours per day over the old method. Without this production degreaser the whole line would be slowed to the tempo of out-moded cleaning methods.

As a consequence many more units of each part are degreased in a day's time—completely—automatically. And the parts are thoroughly clean and ready for the next operation in the production line.

This is just one example of the efficiency effected by many manufacturers who use fast, economical Phillips vapor degreasers in their production operations. Check with Phillips today for the answer to your degreasing problems.



Parts emerge from degreaser on three separate conveyor lines ready for the next operation. Inset shows degreaser complete with solvent recovery still.

New Illustrated Degreaser Bulletin Offered

Phillips Manufacturing Co. offers its newly published degreaser catalog to any one who wishes to obtain a copy. It describes the full line of Phillips degreasers and shows many various and interesting industrial applications. Write Phillips Manufacturing Co., 3457 West Touhy Avenue, Chicago 45, Illinois.

(Advertisement)

PRODUCT LITERATURE

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Metal Cleaning Guide. Oakite Products, Inc., 120 Thames St., New York 6, N. Y., has published a new edition of its 44-page illustrated booklet, **"Some Good Things to Know About Metal Cleaning,"** reviewing metal cleaning in all its many phases.

The booklet discusses the wide variety of soils resulting from such metal-fabricating processes as heat-treating, forging, rolling, stamping, drawing, extruding, spinning, grinding, machining, and buffing. It then describes specific materials, equipment, and procedures for the removal of these soils. Among the many metal cleaning and related operations reviewed in detail by the booklet are the following: tank cleaning methods; machine cleaning methods; electrocleaning steel; electrocleaning non-ferrous metals; pickling, deoxidizing, bright dipping; pre-paint treatment in machines; pre-paint treatment in tanks; paint stripping; steam-detergent cleaning; barrel cleaning, burnishing, cleaning in hard-water areas; treating water in paint spray booths; rust-prevention procedures; machining, and grinding.

"Plating-Room Controls For Pollution Abatement," a manual prepared by the Metal-Finishing Industry Action Committee of the Ohio River Valley Water Sanitation Commission, serves as a guidebook of principles and practice for curbing losses of plating solutions and metals that otherwise might find their way into water courses. In plating-room parlance, the 20-page illustrated manual depicts methods for saving critical materials suggested by leaders in the metal-finishing field.

The guidebook shows, by means of brief descriptions, clear drawings, and photographs, several practical ways to accomplish the desired results. Suggested methods are: "Reduce Dragout Losses; Rinse Effectively; Prevent Leaks and Losses; Salvage (by purification) Contaminated Solutions for Further Use; Sell or Exchange Baths That Can't Be Purified." Detailed suggestions for making use of these specific practices are included in the publication.

Copies may be obtained from Edward J. Cleary, Executive Director, ORSANCO, 414 Walnut St., Cincinnati 2, Ohio.

Chicago Vit Facilities. Chicago Vitreous Enamel Product Co., Cicero, Illinois, manufacturer of porcelain enamel frits, clays, and color oxides, has issued a 68-page brochure describing and picturing its facilities. The brochure is in reality a "plant tour" for it follows in chronological sequence what a Chicago Vit visitor sees on a personal tour through the Cicero plant. It first deals with the manufacturing phase of the business and the steps taken in production control to assure uniformity of products. A complete section is devoted to the research and development laboratories and equipment. There is also a complete section showing the defense production know-how of Chicago Vit, including photographs of an

CLIP FOR FUTURE REFERENCE

POLYETHYLENE DRUM LINERS

Convert Steel Drums to Chemical-Resistant Plastic Containers for:

1. *MOVING SOLUTIONS*
2. *TANK CLEANOUT*
3. *PH and CARBON TREATMENT*
4. *FAST FILTERING*
5. *EMERGENCY OPERATIONS*

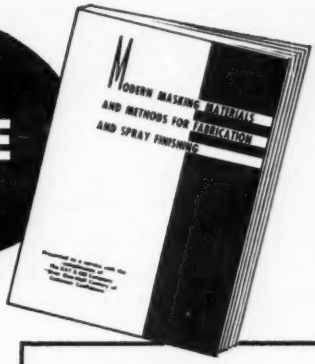
Price **$4.50** ea. $3.95 ea. in lots of 6 or more

by the makers of
THE ENLEY DEMON DEMINERALIZER

ENLEY PRODUCTS, INC.

254 Pearl St. New York 38, N. Y.
Distributors' Inquiries Invited

Kay & Ess GIVES YOU THE ANSWERS...



..To Your Spray Finishing Problems

Yours for the asking! No matter what your product, this informative, up-to-the-minute, detailed manual will be of real help to your finishing engineers, department superintendents and shop foremen. In it you'll find many ideas to help you save time, cut costs and get better product quality. But act quickly! We have only a limited number of these valuable books and want you to get yours.

FOR OVER 50 YEARS
Makers of Fine Varnishes, Japans, Lacquers & Enamels for Industrial Uses.

FREE
ENGINEERING MANUAL
(Regular Price $1.00)

Authored by the well known industrial writer Arthur P. Schulze, this illustrated book covers the field of 'Modern Masking Materials And Methods For Fabrication And Spray Finishing.'

Please send me the engineering manual "MODERN MASKING MATERIALS AND METHODS FOR FABRICATION AND SPRAY FINISHING."

Name_____

Address_____

City_____ Zone___ State_____

armor plate and tank turret program which had previously been restricted from publication.

Copies of this two-color brochure may be obtained by writing to Chicago Vitreous Enamel Product Co., 1401-47 S. 55th Court, Cicero 50, Illinois.

Abrasive Cloth Specialties. B-M Bulletin, Vol. 10, No. 1, issued by Behr-Manning, Troy, N. Y., describes a variety of specialties made from Metalite abrasive cloth for hand finishing, including cylinders, spiral points, cones, pads, and disks. It also shows special applications of abrasive belts.

Defense Order Bulletin. Binks Manufacturing Company, 3118-40 Carroll Avenue, Chicago 12, Ill., has available **D. O. Bulletin 10** and a three-page newsletter. The latter suggests a five-step program that will help manufacturers start or convert to defense orders with the least delay.

The bulletin describes a program that Binks has inaugurated to support this five-step procedure. The inside spread of this bulletin shows pictures of various applications of Binks spray painting equipment such as airplane propellers, shells, airplane wings, and lists the many products that are finished by these spray systems.

Gardner Portable 85-Deg. Glossmeter, specially designed for measurements of sheen of interior wall paints and camouflage paints, is illustrated and discussed in a leaflet prepared by Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md. Prices are included.

Rubber Lined Steel. An illustrated bulletin (4 pages) entitled **"Rubber Linings"** has been issued by Metalweld, Inc., 2602 Hunting Park Avenue, Philadelphia 29, Pa. The bulletin describes rubber-lined steel for transporting, storing and handling corrosive chemicals. The B. F. Goodrich Vulcalock bonding process, with bond strength of over 500 p.s.i. is used to bond the rubber permanently to steel. Tables list common corrosives for which rubber lined tanks can generally be recommended.

Paint Arrestors. Research Products Corp., Madison 10, Wis., has published a 12-page booklet, **"If You Spray Paint . . . We Can Help You,"** which describes the many ways R-P Paint Arrestors can be used to simplify the difficulties frequently encountered in the installation and maintenance of paint spray booths.

Typical installations are described and illustrated, including the use of R-P Paint Arrestors if a water wash spray booth is used, if no paint arrestors are used, and if replaceable paint arrestors or cleanable paint arrestors are used.

"How to Obtain a Protective Finish for Iron and Steel Parts to Meet U. S. Army Specification 57-0-2C; Type II, Class A, and Class B (or equivalent)" are the titles of two four-page leaflets prepared by the American Chemical Paint Co., Ambler, Pennsylvania.

The Armed Forces recognize the need for phosphate coating ferrous surfaces subjected to friction and for phosphate coating and oiling surfaces which are not painted to prevent these from rusting. These treatments are in addition to the phosphate coatings of products that are

Keep spray booths safer from

FIRE!

. . . with non-inflammable,

BOOTHCOTE

Makes frequent cleaning easy. Spray Boothcote on clean booth. When desired, operator peels off overspray in sheets. Advocated by insurance companies.

- Saves time and labor
- Time-proven for 14 years
- Premixed, ready to use
- Does not flake off
- Safe to store
- Can be brushed or sprayed

Money-back trial offer: 5 gals. $6.25 f.o.b. Buffalo or write for Circular.

HYGRADE FOOD PRODUCTS CORP.

Boothcote Div., 16 Stetson St., Buffalo 6, N. Y.

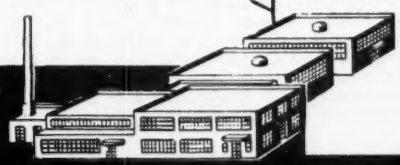
RANDOLPH know-how works everywhere in the arsenal of DEFENSE!

Army and Navy Specification Finishes
Black Enamel E 3
Defense Equip't Protect. Enamels
Pigmented Ammunition Lacquers
Olive Drab Enamel
Tank Finishes
Zinc Chromate Primer
Aircraft S.G. Enamel
Aircraft Dial Finishes
Aircraft Lacquers
Black Primer No. 112
Metal Lacquer 110
Randolph Thinners, Reducers
Aircraft Dopes—Nitrate Dopes
Randolac S F for Metal
Plywood Sealer A-17
Randolph Lacquer XF for Metal
Red Oxide Primers
Colored Lacquers, Metal, Series 2200
Acetate Butyrate Dopes
Undercoats S-G Primers
Infra Red S-G
Texture Enamels (Wrinkle)
High Bake S-G—white, colors
Metallic S-G Finishes
Medium Bake S-G—white and colors
Metal Lacquer 185
Water-proofing Compositions
S-G Silk Screen Paste
Series 112—Plastic Lacquers
Screening Enamels
Exterior Metal Lacquer 120

What is the secret behind the mighty force of American Production?

The answer is know-how—as demonstrated by RANDOLPH in supplying GOVERNMENT SPECIFICATION FINISHES that help achieve production goals. Go into the factories where America's military and civilian needs are being met—and you'll find RANDOLPH giving the special qualities of a superior finish to products ranging from aircraft and ammunition to tractors and appliances.

Get a RANDOLPH FINISH in any quantity—on time! Write us today to avoid any finishing problems.



RANDOLPH
PRODUCTS COMPANY
CARLSTADT, NEW JERSEY

DOPES · LACQUERS · ENAMELS · THINNERS

to be painted. As a result, many products that are being ordered must be finished to comply with Classes A or B of Type II under Specification 57-0-2C. Methods for carrying out these treatments are described very briefly and concisely in these leaflets.

The company has also issued a very comprehensive selection chart of ACP protective coating chemicals for steel, zinc, and aluminum and a chart which lists specification chemicals for the government and its contractors.

Gold Electroplating Processes. Platers Research Corp., 59 E. 4th St., New York 3, N. Y., has available several data sheets, together with price list, describing its Auralloy Process for depositing harder and more durable gold plate, and Auralite water soluble gold alloy salts.

"Physical and Chemical Properties of Agilene (Polyethylene)" is the title of an eight-page booklet prepared by the American Agile Corp., Plastics Div., 5806 Hough Ave., Cleveland 3, Ohio, which deals with the mechanical, electrical, thermal, and chemical properties of polyethylene. Practical data on the fabrication of equipment parts and pipe line assemblies created from polyethylene sheet, rod, and tubing are presented.

Murray-Way 60 Series Polishing Head, which has been designed to afford action as universal as the human hand, is the subject of a leaflet issued by The Murray-Way Corp., Box 180, Birmingham, Mich. The leaflet is illustrated and provides specifications of this polishing head which is adaptable to various polishing applications as required for use on automatic polishing conveyors.

Government Tape Specifications. Purchasing agents and engineers will be interested in this booklet, distributed by the Industrial Tape Corp., New Brunswick, N. J., which classifies pressure-sensitive tapes according to current official U. S. Government specifications.

Clear Coating for Chrome Plate. Laboratory Data Sheet No. 3, discussing Formula 143-C-1, a protective coating for use directly over chrome plate, can be obtained from The Kay & Ess Co., Kiser and Leo Sts., Dayton 4, Ohio. Characteristics of the coating, such as viscosity and weight per gallon, as well as recommended applications, are included.

Metal Cleaning Booklet. The Industrial Division, DuBois Company, Cincinnati 3, Ohio, or Los Angeles, California, is offering a six-page booklet on cleaning metal in industrial washing machines. Designed to help metal fabricators and finishers in the proper choice and use of metal cleaning compounds for industrial washer uses, the booklet contains information on all the basic types of metal cleaning compounds used in aqueous systems, alkaline, emulsion and acid.

An important feature of the booklet is the presentation of the DuBois Engineered Spray Washer Program and Products. The proper selection and recommendations based on a thorough knowledge of specific problems involved in any particular system are outlined and proper installation of the materials and their servicing are stressed.

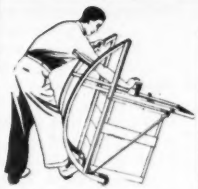
BUILD A BETTER FINISHING DEPT.
Improved
DETROIT
HANDY "TAC" RAG
NON INFLAMMABLE
Switch to DETROIT "TAC" RAGS
and avoid rejects. Remove all dust, lint and sand quickly, efficiently. The standard for 17 years. Order from your supplier today, or send for sample.
FLAME RESISTANT
DETROIT
HANDY "TAC" RAG
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

The No. 41 LIFTING HOOK

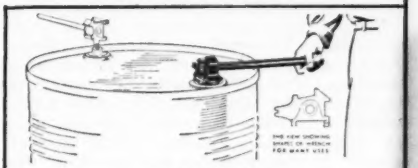
. is primarily designed for drums, although it may be used for barrels. The hook consists of double steel rods and a malleable steel hook with 3 inch diameter welded ring. Lifting capacity is 1000 lbs.

MORSE DRUM AND BARREL HANDLING EQUIPMENT FOR QUALITY, PRICE, SERVICE

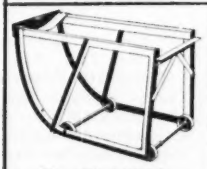
Write for free Booklet



No. 10, $20.70

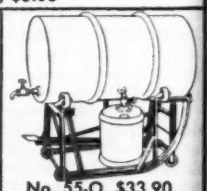


No. 61, $3.00



No. 40, $15.90

No. 41, $4.00



No. 55-O, $33.90

No. 44, $36.20

No. 31
$5.30

No. 100-S, $44.20

MORSE MANUFACTURING CO., INC.
125 Dickerson Street Syracuse 2, N. Y.

Chromalox News Issue No. 44. This four-page booklet, issued by Edwin L. Wiegand Company, 7552 Thomas Boulevard, Pittsburgh 8, Pa., shows specific installations of electric radiant heaters in such finishing operations as enameling, spraying with superheated steam and warming of steel bars before painting.

Polishing and Buffing. J. J. Siefen Co., 5645 Lauderdale Ave., Detroit 9, Mich., is offering a three-color, illustrated booklet describing its materials, equipment, and services. Special attention is given to the Siefen System for application of liquid buffing compounds, Nu-Spray-Glue.

Plating Barrels. Two fully illustrated catalogs featuring Daniels Type H and Type OLS plating barrels have been published by the Daniels Plating Barrel & Supply Co., 129 Oliver St., Newark 5, N. J. Complete descriptions and specifications of each type machine for the electroplating industry are given.

Ucilon Protective Coating. United Chromium, Incorporated, 1700 East Nine Mile Road, Detroit 20, Mich., has issued a bulletin on a coating for protection of plant equipment against strong acids, alkalies, salts, oxidizing agents, water and other corrosives.

For more complete information on products and processes use READER SERVICE CARDS inside covers.

Blackmax Salts for a jet-black finish are the subject of **Data Sheet No. 15** prepared by MacDermid Inc., Waterbury 20, Connecticut.

Corrosion Preventives. Technical Data Sheets, prepared by the Adhesives and Coatings Div., Minnesota Mining and Manufacturing Co., 411 Piquette Ave., Detroit 2, Mich., discuss Formulas EC-1111 and EC-1139, coatings which protect against corrosive action but show off the luster of the metal. Complete descriptions of formulas, specifications, properties, and methods of application are provided.

"Bacterial-Quality Objectives for the Ohio River" is the title of a 30-page manual available from the Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati 2, Ohio, which serves as a guide in the establishment of treatment requirements for sewage discharged in the Ohio River, and as a yardstick for evaluating sanitary conditions in waters used for potable supplies and recreational purposes.

Selenium Rectifiers. A catalog describing its line of selenium rectifiers for all types of electrolytic treatments in the metal finishing field may be obtained from the Lewis Electrical Manufacturing Co., 1943 Walton Ave., New York 53, N. Y. The units are available as self-contained, basic, or remote controlled units in capacities up to 10,000 amperes.

The catalog also gives useful information on rectifier wiring diagrams and current-carrying capacities of various sizes of conductors.

Metal Cleaner Compound. A description of how a recently-developed metal-cleaning material, Oakite Compound No. 33, removes oil and rust in one operation, and also prepares steel and aluminum for painting, is provided in a special booklet available from Oakite Products, Inc., 120 Thames St., New York 6, N. Y., manufacturer of industrial cleaning and related materials.

Whether applied in tanks or by hand, Oakite Compound No. 33, the booklet states, has solvent and detergent properties which are markedly effective in removing various types of soils. In addition, this material provides rapid removal of rust, heat scale, tarnish and other oxides. In preparing metal surfaces for painting, Oakite Compound No. 33 microscopically etches steel and cast iron and converts the surface layer of metal into a thin film of insoluble phosphates to provide excellent bonding of paint to metal, it is claimed. The etching and conditioning action of this material on aluminum sheet and castings is said to be similar.

Protective Coatings. Automotive Rubber Company, Inc., 8601 Epworth Blvd., Detroit 4, Mich., has available a catalog comprised of a series of bulletins describing the application of protective coatings to all types of fabricated materials and construction equipment.

Such rubber lined items as diaphragm tanks, diaphragm converters, exhaust systems, air agitation systems, metal baskets, racks, anode baskets, and so on, are pictured and their functions outlined.

This company has also released a 12-page booklet in which is shown a picture story on the production of rubber goods and their wide application in industry.

Spray Masks. Gleicher Manufacturing Corp., 141 Frelinghuysen Ave., Newark 5, New Jersey, has available a brochure in which is described the company's line of custom die cut and standard painting masks. Applicable to brush or spray painting, the masks and also stencils can be used on such articles as toys, highly polished machine surfaces, name plates and gages.

"Metco News." Volume 5, No. 9 describes and illustrates how "maintenance and operating supplies" dollars can be stretched under NPA Regulation No. 4. Published by Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., the four-page leaflet depicts several typical metallizing applications that save time, money, and material.

Stainless Steel Handbook. A new data and handbook on stainless steels has been published by Allegheny Ludlum Steel Corporation, 2020 Oliver Building, Pittsburgh 22, Pa., and is now available for free distribution to users of the heat and corrosion resistant metals.

Written to fill the growing needs of fabricators and design engineers for more complete on-the-job reference data, material contained in previous handbooks has been completely rewritten and categorized and much additional information has been added. In its 120 pages the cloth-bound volume discusses approximately 40 different types of Allegheny Metal stainless steel and covers each type from standpoints of analyses, fabrication, heat treatment and special conditions of service.

The first chapter in the book is concerned with selecting the proper type of stainless for a given application. A selector table containing about 30 types lists about 40 properties broken down into the general classifications of physical data, electrical properties, heat resistance, working and treating temperatures, mechanical properties and creep strength. A second group of tables in this chapter lists the corrosion resistance of the steels to the various media, including organic substances, acids and salts.

Subsequent chapters discuss each type of stainless separately and in more detail and supply specific information about heat treating, fabrication and certain special conditions in service. Separate chapters are given over to discussions of heat resistant properties and low temperature properties of the metals.

The Aluminum Data Book. A new 194-page publication has just been issued by Reynolds Metals Company, Louisville, Ky., to meet the demand for more factual information on aluminum alloys and mill products.

Vital facts on aluminum alloys and mill products have been condensed in this handy pocket-size manual which contains 117 tables of data on physical, chemical, and mechanical properties; standard tolerances; weights; standard sizes and production limits; as well as much fabricating data. Included are tables showing relative corrosion resistance, the action of many chemicals on aluminum, elevated and low-temperature properties, fatigue strengths, minimum bend radii, joining methods, finishes for aluminum, and much other information.

There are 33 pages of explanatory text covering a wide range of related subjects such as the alloy designation system, the temper designation system, heat-treatable and non-heat-treatable alloys, casting alloys, casting methods, and foundry practice. Wrought aluminum mill products are detailed and manufacturing methods described. Fabricating methods for the wrought alloys are discussed, including blanking and forming operations, machining, forging, joining, and surface finishing.

This book is a revision and enlargement of a similar book issued by Reynolds in 1948 and carries 32 more pages with much additional data covering new alloys not then in use. Wire bound to permit flat opening, this 6 x 9-inch book will be sent without charge to engineers, designers, and technical men who request it on company letterhead. Address Reynolds Metals Company, 2500 South Third Street, Louisville, Ky.

Emulsion Cleaner. The DuBois Co., Industrial Div., Cincinnati 3, Ohio, has available a data sheet describing Super-Mul, a ready-to-use emulsion and solvent cleaner, designed specifically for the removal of industrial soils in spray washing machines. Description and properties of Super-Mul, together with a list of materials on which it can be used, are provided.

"The world situation is tense, our sales have been dropping off — frankly I think the bottom is about to drop out of everything!"

The Finishing Touch — *By J. A. Patterson*

"Gus, old pal, would you mind turnin' on the water?"

Opportunity Section

SOUTH FLORIDA TEST SERVICE

Testing—Inspection—Research—Engineers

Consultants and specialists in corrosion, weathering and sunlight testing.

4201 N.W. 7th St., Miami 34, Florida

FOR SALE

One H.V.W.M. motor generator, 2000 A., 6 V.-220 V, 3 phase 60C with control panel. Built 1943. Priced for quick sale $1850.

One U.S. Electric 1500 A., 6 V.-220 V, 3 phase 60C. Built 1929. $800.

CLESTER W. SMITH
R. D. No. 1, Bethlehem, Pennsylvania

POLISHING AND PLATING SUPERINTENDENT— Must have job shop experience, able to maintain solutions, control production work. Steady position for right man in this fast growing concern employing now 65 people. State age, past experience, etc. Write to Box No. 92, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

REPRESENTATION WANTED

Executive sales engineer in metal finishing, strong organizer with heavy sales record in equipment, industrial chemicals and divers supplies in Metropolitan N. Y. area, seeks representation as manufacturer's agent. Write Box No. 93, c/o PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.

Aluminum Manufacturing. A 16-page booklet showing how the Jones Mills, Arkansas plant produces aluminum pig by the electrolytic reduction process has been published by Reynolds Metals Company, 2500 South Third St., Louisville 1, Ky. It pictures the two new 800-foot long buildings which house the new pot line just put into operation to add some 42 million pounds to the plant's yearly capacity. The plant's original rated capacity of 144 million pounds was provided by eight potrooms. Now with the addition of the two new potrooms, there are ten potrooms, and the total yearly plant capacity is 194 million pounds.

The booklet reveals how these huge quantities of electricity are used in aluminum production. It explains the electric reduction process for producing aluminum from alumina and pictures the equipment. A large mercury-vapor rectifier station, which changes all purchased power from alternating to direct current, is shown and described.

The carbon plant, which makes almost 400,000 pounds of carbon electrodes daily, is also covered in the booklet. Considerable data are given on the Jones Mills Plant. In addition, other Reynolds aluminum production facilities are reviewed

Hardchromers, Incorporated

KRICK ROAD
BEDFORD, OHIO

HARD CHROME PLATING
25,000 AMP. GENERATOR CAPABLE OF HANDLING LENGTHS UP TO 62 FEET LONG

SMALL PARTS A SPECIALTY

ANODIZING
COMPLETELY EQUIPPED
GOVERNMENT SPECIFICATIONS
PROMPT AND GUARANTEED SERVICE

TELEPHONE: BEDFORD 2-1300

INDEX TO ADVERTISEMENTS

Abbott Ball Co. 123
Allied Research Products, Inc. 31
Almco Div., Queen Stove Works, Inc. 8
Alsop Engr. Corp. 90
Alvey-Ferguson Co. 33
American Chemical Paint Co. 65
Armour & Co. 55

Baker & Co., Inc. 71
Baughn Chemical Products Co. 108
Bede Products, Inc. 119
Behr-Manning, Div. Norton Co. 3, 6, 7
Better Finishes & Coatings, Inc. 46
Binks Mfg. Co. 114, 115
Blakeslee & Co., G. S. 125
Buckingham Products Co. ....Third Cover

Cambridge Wire Cloth Co. 129
Carborundum Co. 67
Ceilcote Co. 112
Chemsteel Construction Co., Inc. 90
Chicago Rubber Co. 131
Churchill Co., Inc., Geo. R.. 64
Cincinnati Cleaning & Finishing Mchry. Co. 59
Clair Mfg. Co., Inc. 94
Codman Co., F. L. & J. C. 35
Cowles Chemical Co. 10

Davis-K-Products Co. 128
Detrex Corp. ....Fourth Cover
Detro Mfg. & Sales Co., Inc. 138
Dixon & Rippel, Inc. 36

Egyptian Lacquer Mfg. Co. 4
Enley Products, Inc. 134
Exolon Co. 47

Ferro Enamel Corp. 109

Gardner Laboratory, Inc., Henry 122

Hanson-Van Winkle-Munning Co. 72, 73
Harding Mfg. Co. 132
Harrison & Co., Inc. 128
Harshaw Chemical Co. 85
Heil Process Equipment Corp. 122
Hisey-Wolf Machine Co. 127
Holland & Sons, Inc., J. 66
Houghton & Co., E. F. 91
Hupp Corp., Globe Stamping Div. 103
Hygrade Food Products Corp., Boothcote Div. 136

Industrial Chemical Products Co. 95
Industrial Filter & Pump Mfg. Co. 84
Industrial Washing Machine Corp. ....Second Cover
International Nickel Co., Inc. 45

Jensen Specialties, Inc. 75

Kay & Ess Co. 135
Kellogg Div., American Brake Shoe Co. 38, 39
Keystone Emery Mills 124
Koch Sons, Inc., George 113
Kold-Hold Mfg. Co. 99

Maas & Waldstein Co. 79
Minnesota Mining & Mfg. Co. 57, 77
Miracle Paint Rejuvenator Co., Inc. ..126
Morse Mfg. Co., Inc. 130, 139

National Paint, Varnish & Lacquer Assoc., Inc. 60, 61
National Rack Co. 118
Neilson Chemical Co. 49
New York Blower Co. 105
Nopco Chemical Co., Inc. 69
Norton Co. 2

Oakite Products, Inc. 1
Osborn Mfg. Co. 101

Parker Rust Proof Co. 111
Phillips Mfg. Co. 133
Pittsburgh Plate Glass Co., Paint Div. 42, 43
Platers Research Corp. 48, 130
Puritan Mfg. Co. 120
Potter Paint Co., Inc. 98

Randolph Products Co. 137
Ransburg Electro-Coating Corp. 16, 17
Rockford Varnish Co. 121
Roto-Finish Co. 97

Sherwin-Williams Co. 24, 25
Seifen Co., J. J. 83
Stanley Chemical Co. 81
Stevens, Inc., Frederic B. 37
Striplastic Co. 102
Sulphur Products Co. 118

Tank Coatings, Inc. 70
Thierica Studio 126
Triangle Equipment Co., Inc. 68

Udylite Corp. 23
United Chromium, Inc. 107

Wagner Bros., Inc. 9
Wallace & Tiernan Co., Inc. 63
Williamsville Buff Div., Bullard-Clark Co. 22

"BUCKY" Says....

for best results you can't beat

BUCKINGHAM
POLISHING AND BUFFING COMPOSITIONS

***Meet Present Production Demands* With These Quality BUCKINGHAM PRODUCTS**

- BURRING COMPOUNDS
- EMERY CAKE
- GREASELESS COMPOSITION
- EMERY PASTE
- STEEL CUTTING COMPOSITION

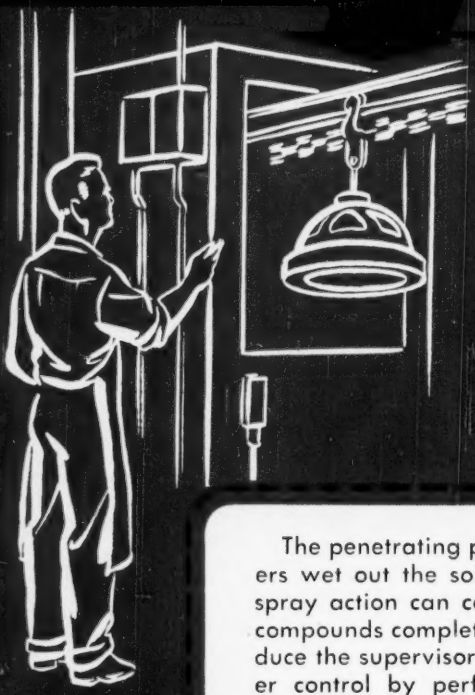
Representation in Major Cities

Write Dep't C for Samples

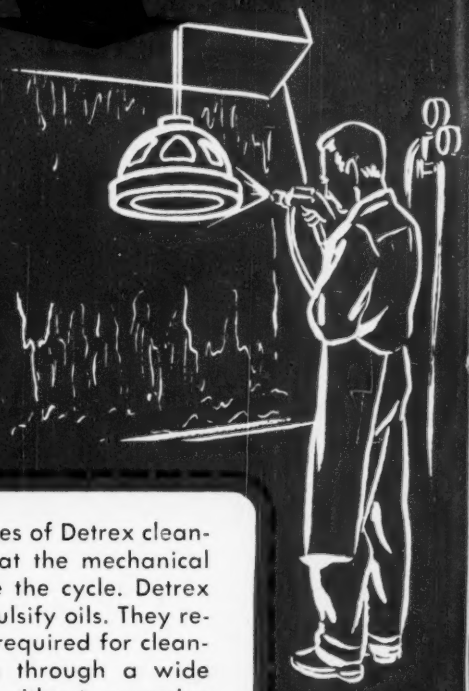
The BUCKINGHAM PRODUCTS *Co.*

14100 FULLERTON AVE. • DETROIT 27, MICH.

Complete Cleaning Here



Cuts Rejects Here



The penetrating properties of Detrex cleaners wet out the soil so that the mechanical spray action can complete the cycle. Detrex compounds completely emulsify oils. They reduce the supervisory time required for cleaner control by performing through a wide range of concentrations without excessive foaming.

You'll reduce the number of rejects in your finishing department when you specify a Detrex cleaner for your spray washer. You'll get complete cleaning.

There's a Detrex cleaning compound for any cleaning application — spray washers, soak tanks, electrolytic. Explain your cleaning operations to your nearest Detrex representative. Let HIM assume the responsibility for your production cleaning.

109

DETREX

BOX 501, DETROIT 32, MICH. Corporation